Railway

Engineering and Maintenance

DECEMBER, 1952

THE NATIONAL LOCK WASHER COMPANY, NEWARK 5, N. J., U. S. A.

You can help reduce costs 3 ways with

RELIANCE LOCOMOTIVE

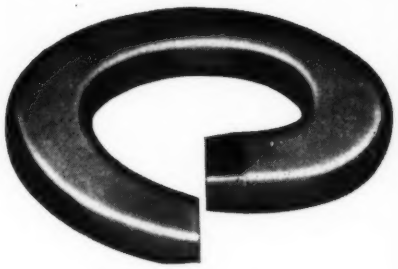
MAINTENANCE—Reliance Locomotive Hy-Crome spring washers are made to stay tighter longer and in turn keep bolted assemblies tighter longer. Fewer periodic maintenance checks are required where Reliance Locomotive Hy-Cromes are used. Railroads save time and money on maintenance.

REPAIR—Reduce costly repairs by using Reliance Locomotive Hy-Crome Spring Washers to protect the equipment on which they are used. They keep bolted assemblies tight and reduce damage to parts caused by a loose fastening.

REPLACEMENT—Bolted assemblies are kept under constant tension and automatically compensate for developed looseness and effectively retard wear. The non-fatiguing alloy steel from which Reliance spring washers are manufactured assures long life for Locomotive Hy-Cromes eliminating the necessity of replacement.

Write today requesting a visit from one of our railway fastening engineers. He will be glad to discuss your motive power spring washer needs with you.

HY-CROME *spring washers*



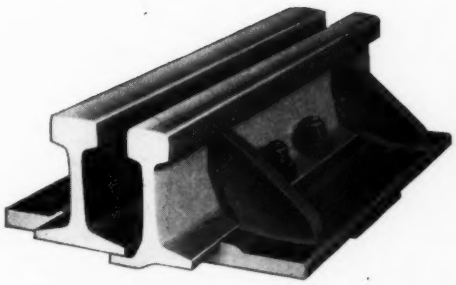
"Tension there in spite of wear"

EATON

MANUFACTURING COMPANY, RELIANCE DIVISION

OFFICE AND PLANTS • MASSILLON, OHIO

SALES OFFICES: NEW YORK • CLEVELAND • DETROIT • CHICAGO • ST. LOUIS
SAN FRANCISCO • MONTREAL



IT WON'T BUDGE!

This is Bethlehem's 751 Hook-Flange Guard Rail. It's strong. It's stubborn. It won't budge, once it's fastened in place. Even vicious side-thrust can't knock it out of line.

One quick glance will show you its obvious features. But some deserve a little closer study. Note, for instance, how the "hook" flange dips under the base of the running rail. It's made that way so that the weight of a passing train will pin it down. Thus no amount of jolting or jarring can make the guard rail tip over.

Take a look, too, at those sturdy, welded side braces. This feature gives the rail added rigidity where it is most needed. In the same zone, the straight guarding area, double-shouldered tie plates are provided—an aid to good alignment.

There are four designs of Bethlehem's Hook-Flange Guard Rail: the 751 described here, and others to meet different preferences and needs. Each design is available in several lengths, so that you can easily choose the size and type that suits your requirements.

Write today for illustrated Folder 555. It contains many helpful details, including a diagrammatic page devoted to settings of Hook-Flange Guard Rails.

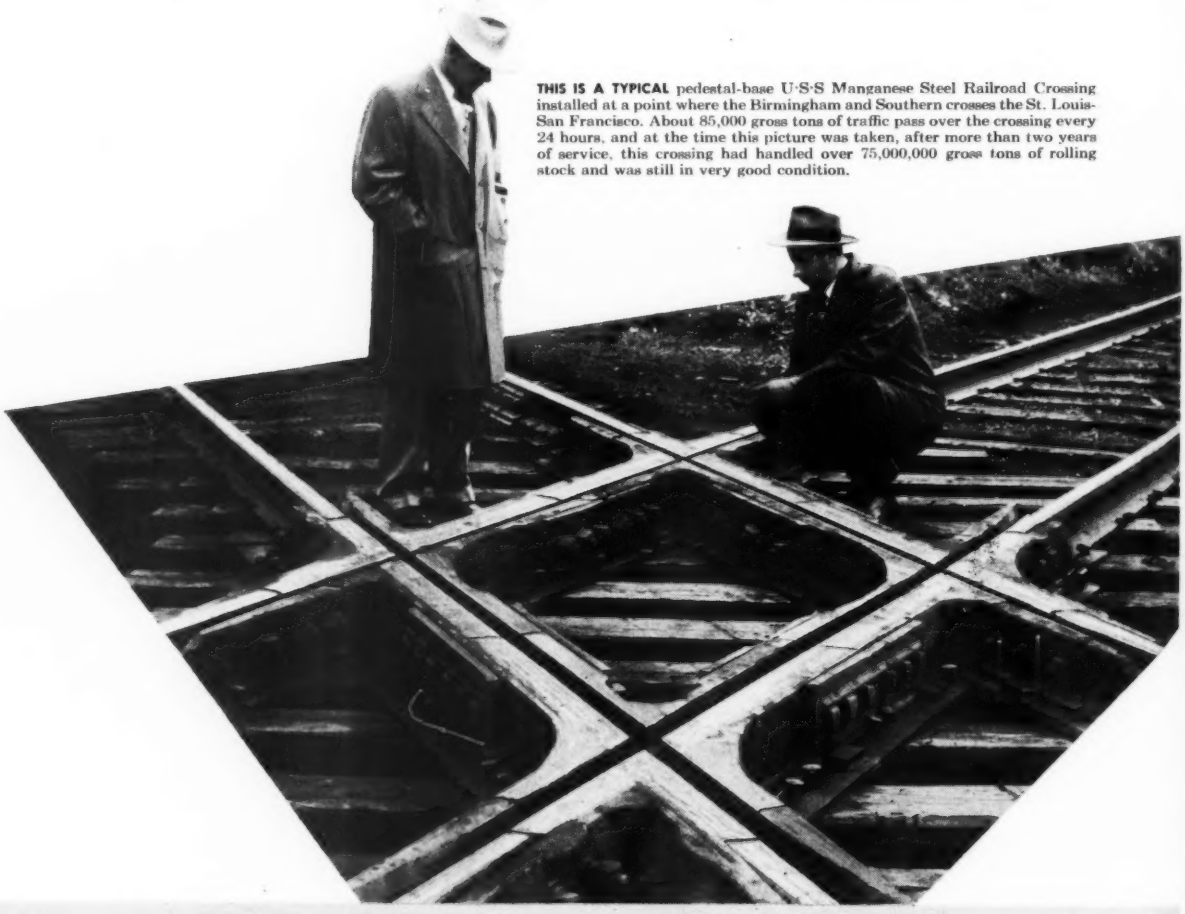
BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

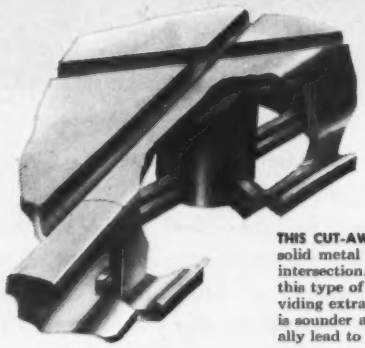
Published monthly by Simmons-Boardman Publishing Corporation, 79 W. Monroe St., Chicago 3, Ill. Subscription price: United States and Possessions, and Canada, one year $2.00 (special rate to railroad employees only, one year $1.00). Single copies 50 cents. Entered as second-class matter January 20, 1933, at the post office at Chicago, Ill., under the act of March 3, 1879, with additional entry at Bristol, Conn. Volume 48, No. 12.

Cut your crossing maintenance costs



THIS IS A TYPICAL pedestal-base U·S·S Manganese Steel Railroad Crossing installed at a point where the Birmingham and Southern crosses the St. Louis-San Francisco. About 85,000 gross tons of traffic pass over the crossing every 24 hours, and at the time this picture was taken, after more than two years of service, this crossing had handled over 75,000,000 gross tons of rolling stock and was still in very good condition.

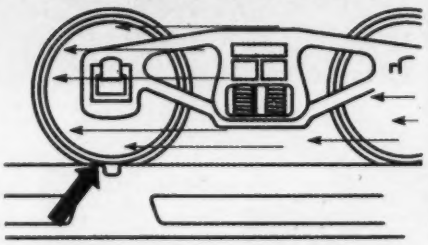
PEDESTAL BASE



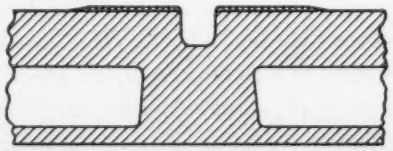
THIS CUT-AWAY VIEW shows the pedestal base of solid metal located directly under the crossing intersection. More liquid metal is used in casting this type of intersection; so, in addition to providing extra vertical support, the entire casting is sounder and freer of internal flaws that usually lead to failure.

THESE TWO cross-section views of (left) an old-style intersection and (right) a pedestal-base intersection clearly show the extra vertical support provided by the sturdier pedestal-base construction. Ordinary intersections are hollow underneath the flangeway intersections at the point where they need the greatest strength.

DEPTH HARDENING



AS SHOWN ABOVE, the corners of ordinary manganese railroad crossings, which are hardened to only 200 Brinell in the shop, are pounded down about ¼" by the batter of train wheels and require extensive rebuilding.



ON DEPTH-HARDENED U·S·S Manganese Steel Crossings a ½" x 5" pad is cast integrally on each critical corner of intersections. This pad then is hammered to a hardness of 400 Brinell and ground to surface level before installation. This minimizes the damaging effects of wheel batter.

with stronger, more durable

U·S·S MANGANESE STEEL RAILROAD CROSSINGS

U·S·S MANGANESE STEEL RAILROAD CROSSINGS provide the extra strength and durability so necessary in crossings that must stand up under constant pounding from today's faster, heavier trains. In addition, these crossings require a minimum of maintenance, and, therefore, reduce costs and service interruptions.

Both improved design and improved metallurgical practice contribute to the outstanding performance of U·S·S Manganese Steel Railroad Crossings.

Unique Pedestal Base Assures Extra Strength and Longer Life

In these crossings, a pedestal base—a solid column of tough manganese steel—provides extra vertical support right where it's needed most: at the intersections, where wheel pounding is most severe. This pedestal base is many times stronger than the rib construction typical of ordinary crossings; and its extra support reduces deflections caused by wheel batter, a major cause of internal cracks that eventually lead to failure.

An improved method of casting adds additional strength and reliability. To minimize porosity and cavities characteristic of ordinary manganese castings, 5 to 10 times as much feed metal is used for these pedestal-type crossings as for other types, and the feed is much more closely controlled. This practice results in an improved casting.

Depth Hardening for Minimum Maintenance

U·S·S Manganese Steel Railroad Crossings are depth hardened to approximately 400 Brinell *before* leaving the shop. In other manganese crossings, track surfaces are hardened to only about 200 Brinell before installation—the pounding of train wheels is depended on for additional hardening. This wheel pounding batters down the corners of intersections, and these corners must be built up again by welding and grinding.

This needless maintenance and expense is eliminated with U·S·S Depth-Hardened Railroad Crossings. Before they leave the shop, all intersections are *hammered* to a hardness of 400 Brinell—the hardness required for modern railroad service—and ground to surface level. This assures maximum durability and resistance to wheel wear.

ADVANTAGES OF U·S·S MANGANESE STEEL RAILROAD CROSSINGS

✓ Longer life
✓ Greatly reduced maintenance
✓ Extra strength

U·S·S for All Your Trackwork

The improvements in design and metallurgical practice that are used in U·S·S Manganese Steel Railroad Crossings are typical of the extra care and effort that go into the making of all United States Steel Trackwork products; so specify U·S·S for all your trackwork requirements. We supply joint bars, tie plates, switches, frogs, and special track layouts, including crossings. In all of these the U·S·S label assures you of top quality and service.

USS

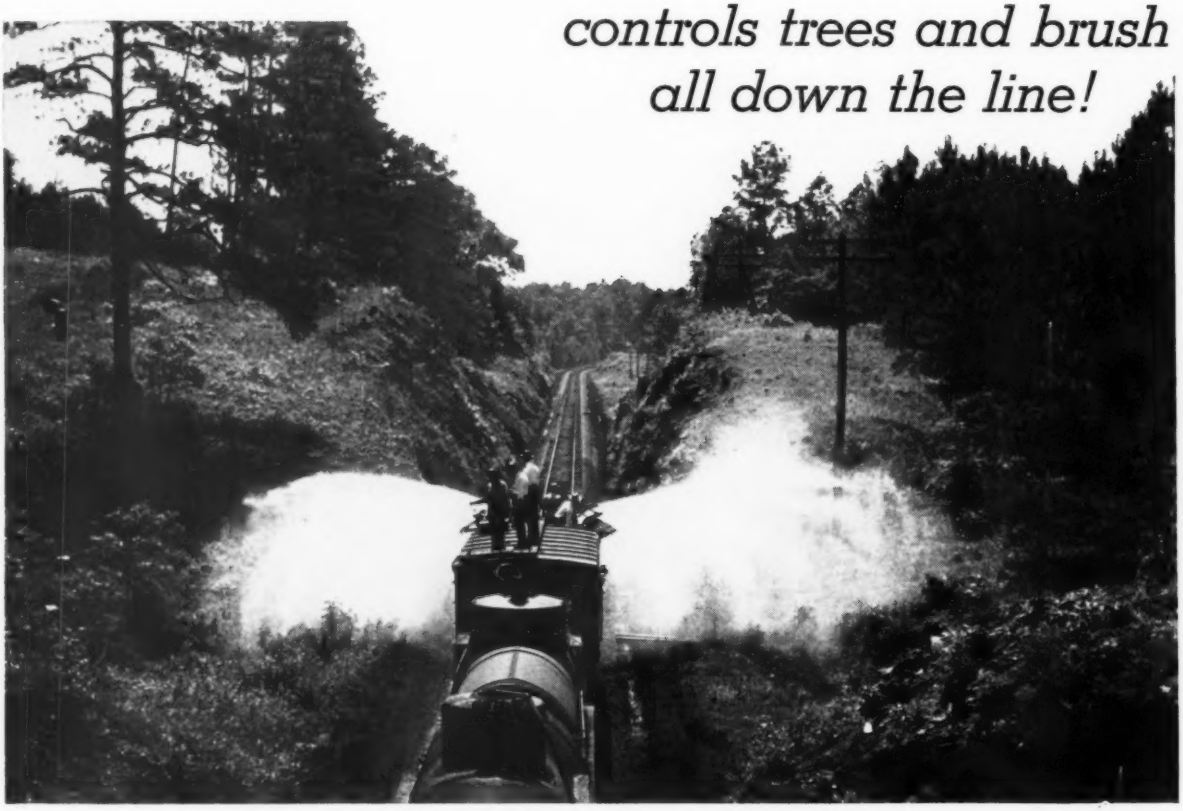
UNITED STATES STEEL COMPANY, PITTSBURGH · COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

2-1493

UNITED STATES STEEL

Esteron® Brush Killer

controls trees and brush all down the line!



When maintenance men and spray service organizations think of chemical brush control on railroad right-of-ways, they think first of Esteron Brush Killer. Dow research and manufacturing experience have gone all-out to make it the best product in its field. Research like this improves know-how *all down the line*—for Dow as well as for manufacturers of special purpose spray equipment, and for persons responsible for using and recommending chemicals for vegetation control.

Esteron Brush Killer contains the new, proved, highly effective, low volatility propylene glycol butyl ether esters of 2,4-D and 2,4,5-T. Included in a maintenance program, it gives good control of alder, ash, birch, brambles, cherry, elm, hickory, maple, oaks, osage orange, poison ivy, sumac, willow and other hard-to-kill species of brush and trees. For certain 2,4-D resistant species, use Esteron 245 containing low volatility propylene glycol butyl ether esters of 2,4,5-T—also useful for year-round basal bark application and stump treatment. For grass control, use Dow Sodium TCA 90%.

You are invited to look to Dow for a complete line of vegetation control chemicals. A wealth of technical information and assistance is yours on request.

THE DOW CHEMICAL COMPANY

Agricultural Chemical Department

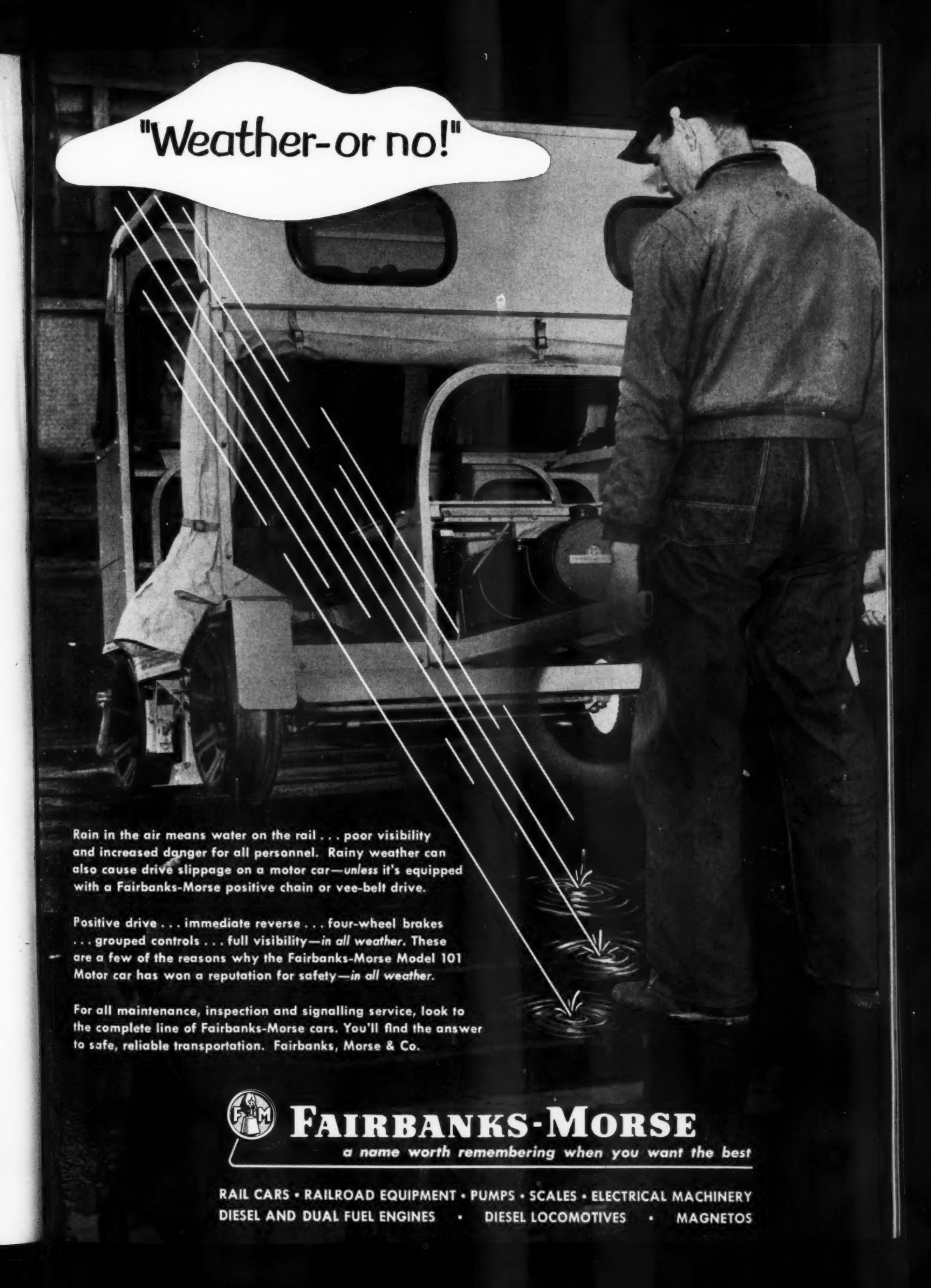
MIDLAND, MICHIGAN

In Canada: Dow Chemical of Canada, Limited, Toronto, Canada

DOW

CHEMICALS

INDISPENSABLE TO INDUSTRY AND AGRICULTURE



Rain in the air means water on the rail . . . poor visibility and increased danger for all personnel. Rainy weather can also cause drive slippage on a motor car—*unless* it's equipped with a Fairbanks-Morse positive chain or vee-belt drive.

Positive drive . . . immediate reverse . . . four-wheel brakes . . . grouped controls . . . full visibility—*in all weather.* These are a few of the reasons why the Fairbanks-Morse Model 101 Motor car has won a reputation for safety—*in all weather.*

For all maintenance, inspection and signalling service, look to the complete line of Fairbanks-Morse cars. You'll find the answer to safe, reliable transportation. Fairbanks, Morse & Co.

FAIRBANKS-MORSE

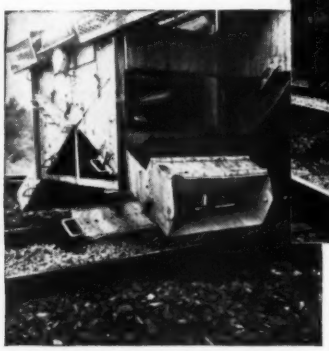
a name worth remembering when you want the best

RAIL CARS • RAILROAD EQUIPMENT • PUMPS • SCALES • ELECTRICAL MACHINERY
DIESEL AND DUAL FUEL ENGINES • DIESEL LOCOMOTIVES • MAGNETOS

The new Pullman-Standard Power Ballast Cleaner and Winch Car team, the result of three years of field research and engineering, for the first time enables railroads to clean both track shoulders at once at a rate of 1000 to 1200 feet an hour with the labor complement of only four men. Both units have completely automatic controls located in their cabs. A triple-deck screen provides separate cleaning of large and small ballast, thus providing more thorough ballast cleaning and less loss of "fines." (Screen mesh sizes may be changed to meet specifications.) A rotary lift wheel carries the dirt from the screen discharge to the dirt conveyor. The 140° arc of the dirt conveyor is controlled from the cab, allowing distribution of the dirt into either an adjacent or following car or truck or on the berm of either shoulder, or beyond the drainage ditches.

Each of the revolving augers are self-inserting and bore into the ballast, break it up, and deliver the dirty ballast to chain buckets which then convey the ballast to a shaker screen for cleaning. The elevators and auger are operated hydraulically and can be raised or lowered independently. They will cut to any desired depth 8 to 10 inches below the tie base, depending upon the length of the tie.

Self-aligning plows, one in back of each auger, follow the irregularly protruding tie ends to undercut and extrude the hardened seal which fringes the tie base, thus performing an operation essential to good track drainage. The depth of these plows can be adjusted manually to meet local conditions. The cleaned ballast falls into place just in back of these plows as the Cleaner moves forward.



Simple preset distributing mechanism automatically puts the clean ballast back on the track in any location and in the proportionate amounts desired, thus requiring only two laborers to follow in rear of the machine to finish distribution and clear ties. **The Power Winch Car**—its 30,000 lbs. of pulling force enables the Cleaner to push through the most cemented ballast. It runs out ahead of the Cleaner, unwinding its cable and anchors itself in place with two, independent, self-aligning rail clamps, then winches in the cable. The clamps, designed not to slip on oily or peened rail, will function on rail of any gauge, type or condition of railhead without marking the rail. The 1000-foot, doubly looped ⅞" cable, with a breaking point of 60,000 lbs., is wound on a drum equipped with an automatic slip clutch that can be set from 0 to 30,000 lbs. so that it slips when obstacles are met. The cable can be unwound completely in 2 minutes and can be wound in at 600 to 5800 feet an hour.

SUBSIDIARY OF

ROAD & TRACK EQUIPMENT DIVISION **PULLMAN-S**

BIRMINGHAM • PITTSBURGH • NEW YORK • WASHINGTON • SAN FRANCISCO • 79 EAST ADAMS STREET

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CHIC

Four men and new Power Cleaner

An operator for each machine and two laborers—this is all the manpower you need to clean ballast with the Power Ballast Cleaner and Winch Car team. But savings on labor are not all. You'll find that the work rate of 1000 to 1200 feet an hour will give even more savings because this versatile production team *cleans both shoulders simultaneously* to a depth of eight to ten inches below the tie base. Even in multiple track territory, the shoulder plus half the six foot are cleaned with just as few workers and at the same high production rate. On previously cribbed track, both crib and shoulder ballast of both shoulders are cleaned at 600 to 900 feet an hour, depending on how cemented the ballast is.

clean both track shoulders at once

Everything about this work team is designed to give you the highest production rate possible in the track time available. Set-up time takes only a few minutes once each work trick. Both units have powered, lateral set-offs and running speeds of 25 mph. in forward or reverse. Since each machine can run independently or tow the other, power failure in one will not tie up your track or delay traffic.

The Power Winch Car, developing up to 30,000 pounds of tractive force, assures effective operation even in the most cemented ballast, such as is found at grade crossings, and its exclusive rail clamping device, regardless of rail conditions, gives positive anchorage (without marking rail) with a full load on the cable.

at 1000 to 1200 feet an hour

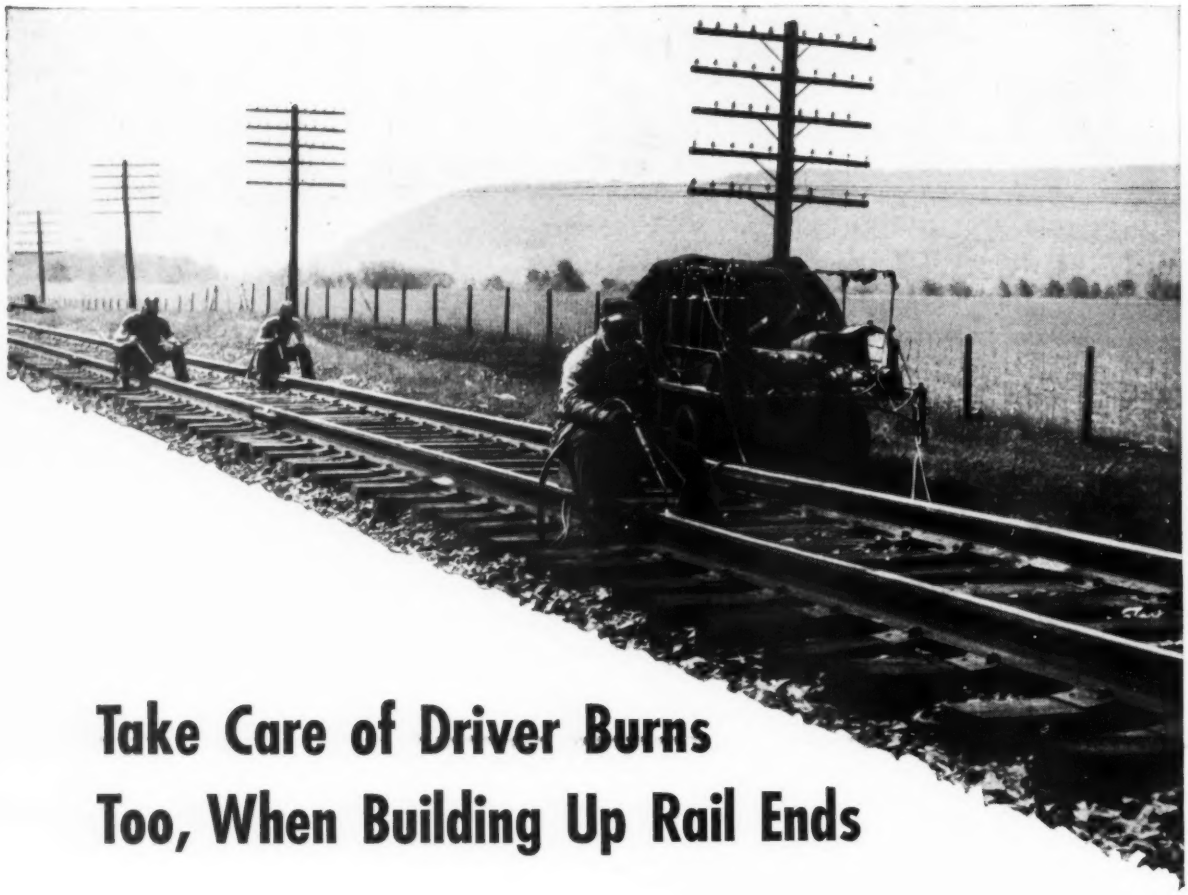
You can prove to yourself on your own track just how this Power Ballast Cleaner team cuts labor costs, makes maximum use of track time without the use of "dead" track or work train, and gives you high quality production at low cost, by choosing one of these four ways: (1) rental for six months with option to buy and all rental payments applied to purchase price; (2) straight rental for six months; (3) deferred quarterly payments over a period of one to three years; (4) outright purchase.

When in Chicago, you are cordially invited to visit our Michigan Avenue Industrial Showrooms.

PULLMAN INCORPORATED

STANDARD CAR MANUFACTURING COMPANY

CHICAGO 3, ILL. • THE HOLDEN CO., LTD., MONCTON • MONTREAL • TORONTO • WINNIPEG • VANCOUVER



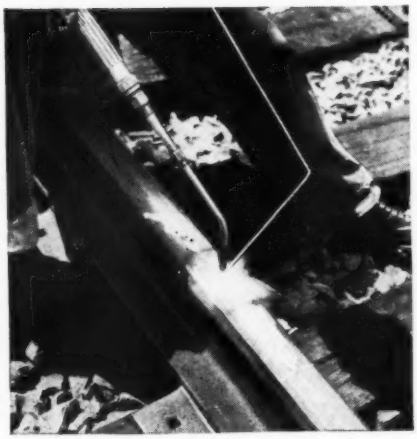
Take Care of Driver Burns Too, When Building Up Rail Ends

When your rail-end welding gangs are out on the job, driver burns can be repaired at the same time. Manpower, tools, and supplies are all on hand to do both jobs.

The pictures show how driver burns are removed by a large Eastern railroad. The gang shown is one of several out on the line using OXWELD MW rod to build up rail ends and eliminate driver burns. Frequent checks with the rail detector car in the last five years have shown that the original soundness of the rail has been restored.

Call on OXWELD for details on how this procedure can be adapted to your track programs.

"Oxweld" and "MW" are registered trademarks.



Here's how easily driver burns are built up with OXWELD MW rod.

OXWELD RAILROAD SERVICE COMPANY
A Division of Union Carbide and Carbon Corporation
UCC
Carbide and Carbon Building Chicago and New York
In Canada:
Canadian Railroad Service Company, Limited, Toronto

OXWELD RAILROAD SERVICE

SINCE 1912—THE COMPLETE OXY-ACETYLENE SERVICE FOR AMERICAN RAILROADS

the New

OLIVER "OC-18"

the Operator's Dream come true!

Here's a tractor that has been designed specifically to make life as easy as possible for the operator. Just check this list of "easy operating" features —it puts the "OC-18" 'way out in front as the tractor that gets more done . . . faster . . . every day.

1. Over-Center Clutch. The clutch bar runs across the full width of the dashboard. No need here for the operator to hunt for a single lever . . . to take his eyes off the work.

2. Air Steering is *Standard Equipment* You can steer the "OC-18" with just two fingers of one hand.

3. Push Button Electric Starting. The husky starter of the "OC-18" gets the engine going . . . quick.

4. Cold Weather Starting Aid...standard equipment on the Oliver "OC-18" for fast, easy starting in extremely low temperatures.

5. Center-Positioned Gear Shift Lever . . . is located right where it's easiest to reach.

6. Ample Leg Room . . . no cramped legs after a hard day's work with the "OC-18".

7. Convenient Foot Parking Brakes are standard equipment on the "OC-18".

8. Comfortable, Two-Man Seat . . . plenty of room for two men in this upholstered seat.

9. Easy-Acting Friction Throttle is located at the right arm rest of the seat in the most convenient position for the operator.

You get plus performance too! A full 126 drawbar horsepower . . . greater stability . . . more track on the ground. Just note the photograph. See how the track hugs the ground almost its entire length. It means real pulling power . . . greater stability and better balance for dozing.

Try out this great new tractor yourself. Ask your Oliver Industrial Distributor to arrange a demonstration. When you've seen the "OC-18", you'll never be satisfied with any other big tractor.

THE OLIVER CORPORATION

400 West Madison Street, Chicago 6, Illinois

A complete line of industrial wheel and crawler tractors

The OLIVER Corporation, Industrial Division
400 W. Madison Street
Chicago 6, Illinois

Gentlemen:

Please send me literature on the Model "OC-18" Industrial Crawler Tractor.

Name .....

Company ..... *Dept.* .....

Address .....

City ..... *State* .....

FLAME... for a "PAINT READY" SURFACE

AIRCO flame cleaning removes mill scale and crusted deposits *completely* – as only searing heat can do the job. Old paint and rust disappear... leaving the surface clean and moisture free – ready for immediate protective coating. The sooner you paint after flame cleaning, the better the job!

AIRCO provides a number of special-application flame cleaning tips. For structural steel ... car sides and underframes ... angle bar sections of rails ... as well as special tip assemblies to prepare axles for magnetic particle inspection. All are readily adaptable to your present welding equipment.

AIRCO recommends the proper equipment... assists you in designing flame cleaning positioners and fixtures for special applications ... maintains a fully-staffed Railroad Technical Department to help you in the initial stages of any flame cleaning operation. Contact your nearest Airco office!

AIRCO®

AIR REDUCTION

AIR REDUCTION SALES COMPANY · AIR REDUCTION MAGNOLIA COMPANY
AIR REDUCTION PACIFIC COMPANY
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Offices in Principal Cities

at the frontiers of progress you'll find

1-man Work-crew*

*** Saves Labor**

*** Saves Time**

*** Saves on Equipment Investment**

One man at the controls of a TRAXCAVATOR Shovel will multiply your manpower efficiency . . . handle jobs faster than big crews of hand labor . . . give you more service for less investment than specialized equipment . . . keep your operating costs to a minimum.

Here's what your one-man crew can do: Clean yards and right-of-way of deep packed snow. Handle stockpiled materials quickly and efficiently. Excavate for new construction. Build ditches and roadbed. Backfill. Maintain right-of-way. Spot cars. Move machinery.

A TRAXCAVATOR Shovel — teamed with a "Cat" Diesel Tractor — can handle all these jobs, and more too. Put your line work in the hands of an expert — a one-man work-crew — a TRAXCAVATOR Shovel. Your "Caterpillar" Dealer can show you how a TRAXCAVATOR Shovel can save you work, save you valuable time and save on your equipment investment. Call him or write direct.

Clear the track—and yards, too—with an HT4 TRAXCAVATOR Shovel. Here deep piled snow is loaded into hauling units for disposal. Yard activities are not curtailed for the HT4 can work in close quarters and is out of the way fast!

CATERPILLAR TRACTOR CO., Peoria, Illinois

TRACKSON

REG. U.S. PAT. OFF.

A SUBSIDIARY OF CATERPILLAR

TRAXCAVATOR® SHOVELS
PIPE LAYERS
ANGLEFILLERS

FASTER MOVES... SAFER HANDLING... LABOR SAVED...

REPORTED BY MR. R. E. TAYLOR

C. I. & L. R. R.

MONON SHOPS
LAFAYETTE, INDIANA

Mr. R. E. Taylor, General Storekeeper of the Chicago, Indianapolis and Louisville Railway (Monon Division), reports a long list of advantages from Lorain crane operation. This busy road has purchased Lorains three times. That's proof of satisfactory performance. Mr. Taylor further states, "We find with this crane our materials are being handled more promptly, more efficiently, at a considerable saving in labor." Here are specific reasons why:

SAFER HANDLING, FLEXIBLE USE

"The Lorain crane is assigned forty hours per week in the handling of scrap, coal, rail, frogs, switches, lumber, heavy timber, poles, piling, wheels and all other heavy materials to and from open top cars. Due to the flexibility of this type of crane we have accomplished safer handling of materials, and particularly in the case of the magnet much hand labor heretofore spent has been eliminated. This crane is used over our entire Shops grounds, containing some forty acres, and if necessary can be operated on the highway at a speed of eight to ten miles per hour."

MOBILE CRANE MEETS EMERGENCIES

"The mobility of our Lorain crane is such that it can be moved from one location to another in a very short time, whereas the locomotive crane, on track, necessitated switching of cars and in our particular instance required switching from one yard to another by a yard engine. In case of emergency this crane operates promptly, whereas with the steam crane it was necessary to allow considerable time for getting up steam and moving it to the location where required."

What better reasons could you find for contacting your nearest Thew-Lorain distributor? He can put Lorain crane efficiency to work for your road in a hurry!

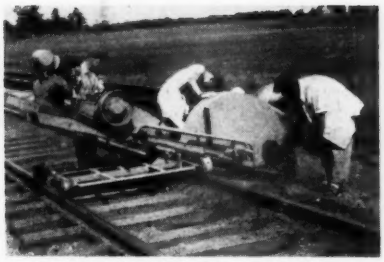
THE THEW SHOVEL CO., LORAIN, OHIO

This 20-ton Lorain Self-Propelled crane, Model SP-414, unloads cars at the Monon Shops of the C.I.& L. R.R. This mobile crane covers some 40 acres of shop grounds. Other Lorain types, including crawler and 2-engine Moto-Crane mountings are also available—with 5 convertible front ends.

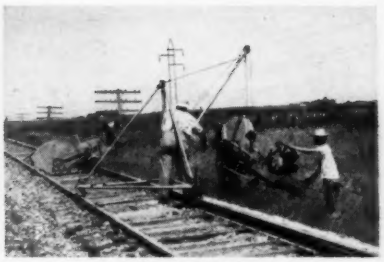
THEW LORAIN

MOBILE CRANES FOR RAILROADS

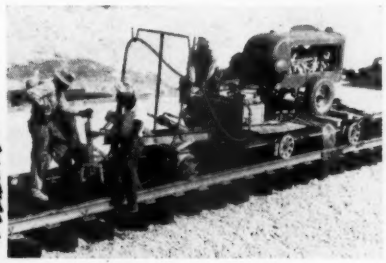
1. Kershaw Ballast Regulator, Scarifier and Plow.



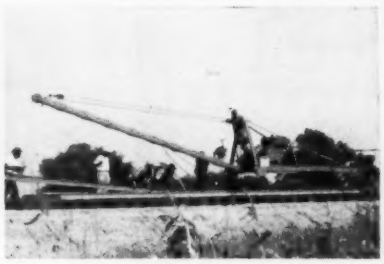
2. Kershaw "Wheel Type" Kribber.



3. Kershaw Utility Derrick.



4. Kershaw Pneumatic Tie Nipper.



5. Kershaw Mocar Crane.

5 WAYS TO CUT TRACKWORK COSTS

All of these Kershaw trackworking machines were developed on actual track laying and maintenance contracts. Proof of the savings lies in the experiences of many railroads and railroad contractors who have used Kershaw trackworking equipment.

Believe it or not, any Kershaw machine will pay for itself the first year or with its first 15 to 20 miles of trackwork. After that, the savings are "velvet". Prove this to your own satisfaction on our trial-rental plan. Complete details on request.

HERE ARE SOME FIGURES

Item	Machine	Operation	Savings
1	Kershaw Ballast Regulator, Scarifier and Plow	(a) Regulate, distribute and shape ballast in surfacing gangs.	$600.00 to $1,000.00 per mile.
		(b) Scarifying, deweeding, plowing and maintaining ballast shoulder.	$300.00 to $400.00 per mile.
2	Wheel Type Kribber	(a) Cribbing ahead adzers in relaying gangs.	$150.00 to $200.00 per mile.
		(b) Skeletonizing.	$300.00 to $350.00
3	Utility Derrick	Setting off relaying equipment.	5 minutes each closure.
4	Pneumatic Tie Nipper	Nipping ties.	2 men.
5	Mocar Crane	Seting up rail in relaying operations.	$10,000.00 on capital investment.

INVESTIGATE OUR TRIAL-RENTAL PLAN

If you have not seen it, write for a copy of Kershaw "Track Talk" Magazine, published bi-monthly. It's Free!

KERSHAW MANUFACTURING CO., INC., P. O. BOX 510, MONTGOMERY, ALA.

TRACKWORK EQUIPMENT DESIGNED, DEVELOPED AND PROVEN ON THE JOB

OUR *WOOLERY MOTOR CARS*

are the least expensive, least temperamental, hardest working members of our crew!

— say maintenance men

4-wheel drive
differential when needed
13 H.P. air-cooled engine
2-speed transmission
forward and reverse
light weight
heavy duty
pulls ten tons with ease
one man can lift off track

Summer or winter, the WOOLERY 300 is the tireless, dependable work-horse of the gang. Low maintenance and uninterrupted service are well-known features of this rugged motor car, but its real value lies in the easy handling and all-weather dependability that has won the confidence of the men on the line!

Send for folder 178

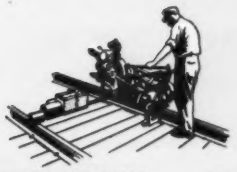
SINCE 1917 RAILWAY MAINTENANCE EQUIPMENT

Woolery MACHINE COMPANY

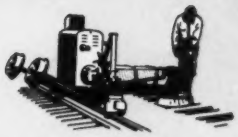
2919 COMO AVE. S. E. MINNEAPOLIS 14, MINN.

Exclusive export representatives:
Pressed Steel Car Company
New York 17, N. Y.

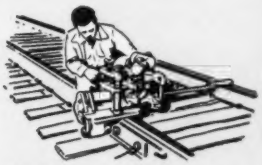
SPIKE PULLER . . . By getting spikes out faster this machine speeds up relaying and reduces the cost of the entire operation.



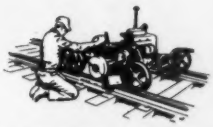
TRACK WRENCH . . . Provides uniformly controlled tightening on track bolts to prolong rail life and make better riding track.



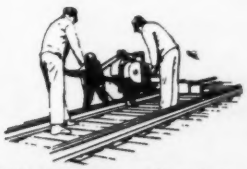
ADZING MACHINE . . . Provides tie seats in keeping with today's track maintenance standards. All level and in same plane.



RAIL DRILL . . . A compact, lightweight, low-cost easily set drill that proves a money saver.



RAIL GRINDERS . . . With four types of grinders, Nordberg can supply the machine best suited to any type of maintenance grinding.

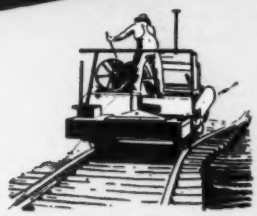


SPIKE HAMMER . . . All spikes driven straight and at big savings in time and money.

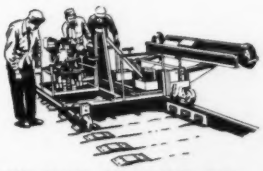
Use these NORDBERG "Mechanical Muscles"* to do a better, faster maintenance job at lower cost!

POWER JACK . . . Maintains alignment while speeding up ballasting and general surfacing operations.

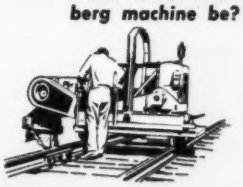
LOOKING AHEAD . . . Each year, for the last 6 years, Nordberg has introduced at least one new machine specifically for track work. *What will the next Nordberg machine be?*



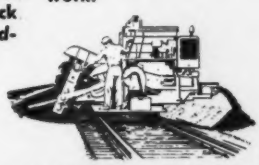
TRACK SHIFTER . . . Especially suited to heavy lining and high lifts. For new construction, flood repair and grade or line change work.



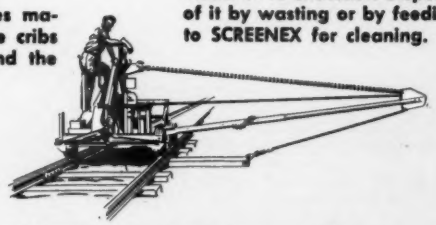
DUN-RITE GAGING MACHINE . . . Nordberg's newest development — for extremely accurate gaging by correctly positioning the tie plates.



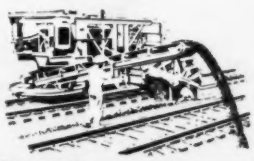
CRIBEX® . . . Removes material contained in the cribs and deposits it beyond the ends of the ties.



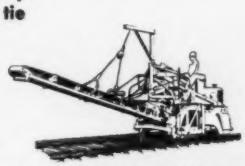
BALLASTEX® . . . Excavates the ballast in area between tracks or in shoulder. Disposes of it by wasting or by feeding to SCREENEX for cleaning.



GANDY® . . . A triple-purpose machine for pulling ties—inserting ties—and as a material handling crane.



SCREENEX® . . . Takes excavated fouled ballast fed by BALLASTEX, cleans material and returns it to track, intertrack, or shoulder.



DSL YARD CLEANER . . . Cleans more track faster, better, more economically . . . without damaging ties.

For full details on any or all of these Nordberg "Mechanical Muscles"*, write for Bulletins.

*Copyright 1952 Nordberg Mfg. Co.

R1052

NORDBERG MFG. CO.

MILWAUKEE, WISCONSIN

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parts and service...

QUICKLY

AVAILABLE

Fast, efficient service and parts supply from these assembly and stand-by plants in Warwick, N. Y. Our service engineers make periodic road checks of all equipment.

THE MATISA EQUIPMENT CORPORATION
224 South Michigan Blvd. • Chicago 4, Illinois

TRACKWORK SPECIALISTS ALL OVER THE WORLD

Matisa

NEWS NOTES...

DECEMBER, 1952

...a resumé of current events throughout the railroad world

Plans for Modernization of the Pennsylvania's Conway yard, 24 miles west of Pittsburgh, have recently been announced by the railroad as a part of a three-year, $47-million program of freight-service improvements, designed to provide faster schedules, better service to shippers, increased capacity and more economical operation. The new Conway yard will have 85 tracks and a classification capacity of 8,000 cars a day. The yard project is expected to cost approximately $34 million. The other major phase of the program involves the construction of a new $12-million freight-car repair shop, to be located at Hollidaysburg, Pa. Other segments of the program will include new icing facilities and improved livestock handling accommodations.

•

A new monthly magazine designed primarily for circulation among users of railway freight service will be launched in January by the Simmons-Boardman Publishing Corporation. To be known as *Railway Freight Traffic*, the new publication will supersede the special editorial service and special shipper distribution of the Freight Traffic Issue of *Railway Age*.

•

Purchases of all types of materials by domestic railroads during the first seven months of 1952 involved the expenditure of $1,407,586,000. During the comparable period of 1951 the value of materials purchased by railroads in this country, including orders for equipment, totaled $2,029,472,000. In all categories except crossties, purchases during this year's first seven months have fallen behind 1951.

•

The 4,000-hp. gas-turbine electric locomotive, built for experimental research by the Westinghouse Electric Company and the Baldwin-Lima-Hamilton Corporation, recently completed a series of tests in regular passenger service on the Chicago & North Western. To date the locomotive has made 227 trips while in operation on three roads—the Pennsylvania, the Missouri-Kansas-Texas and the North Western.

•

Class I railroads in the first nine months this year had an estimated net income, after interest and rentals, of $502,000,000, according to the Bureau of Railway Economics, Association of American Railroads. The 1952 figure compares with a net income of $391,000,000 for the first nine months last year. Net railway operating income in the nine-month period this year totaled $732,335,415, compared with $606,459,584 in the first nine months of 1951.

•

Figures recently made available show that maintenance of way and structures expenditures of the Class I railroads in August, 1952, totaled $125,728,937, compared with $134,694,531 in August, 1951, a decrease of $8,965,594, or 6.7 per cent. Maintenance of equipment expenditures in the same period amounted to $156,913,381 as compared with $167,297,405 in 1951—a decrease of $10,384,024, or 6.2 per cent.

NEWS NOTES (continued)

The Frisco is beginning a program of applying "Scotchlite" reflective material to all freight locomotives, flat cars, pulpwood cars and wallboard cars in an effort to increase night-time visibility of freight trains at highway grade crossings. The Rock Island, in its safety program, has marked some 200 freight cars with reflective material, in addition to all of its passenger cars and diesel freight locomotives. All switching locomotives are now slated to receive this treatment.

•

The Defense Transport Administration has sent to the Defense Production Administration its request for controlled materials for the second quarter of 1953. For domestic railroads, the DTA claimed sufficient material to construct 27,000 freight cars, 1,500 tank cars, and 100 passenger-train cars. In addition, the DTA asked for allocation of 450,000 tons of new rail to be laid in replacement during the April-June period.

•

Motor carriers are taking the majority of the graduates of the University of Tennessee's 280-student transportation department, according to a recent announcement from that institution. The announcement further states that although enrollment in the department continues to increase, the demand for transportation graduates is still much greater than the supply.

•

Two new freighthouses were recently opened by the Santa Fe in a period of less than two weeks. The first, on Chicago's southwest side, was opened October 28, and the second, opened November 10, is located in San Francisco's China Basin district.

•

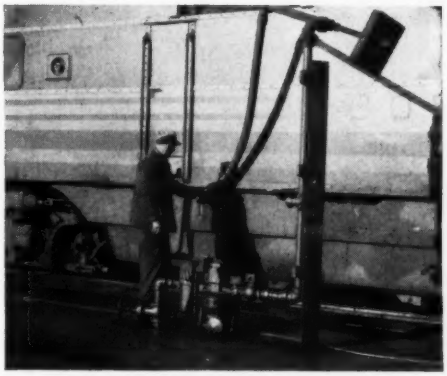
The Baltimore & Annapolis, which operates both rail and motor service between Baltimore, Md., and Annapolis, has filed an application with the Civil Aeronautics Board seeking authority to set up scheduled air-line service between Washington, D.C., and New York City. The proposed air line would employ the latest helicopter aircraft to transport persons, property and mail. One segment of the proposed air line would operate between Baltimore and Washington via Annapolis. Another segment would operate between Baltimore and New York, via Philadelphia and Wilmington, Del.

•

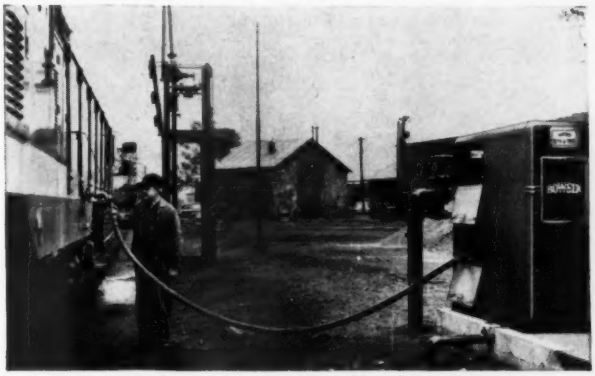
ALSO WORTH NOTING—The Lehigh Valley is installing cigarette vending machines in smoking cars on its New York-Buffalo "Black Diamond." Candy vending machines are being placed in adjoining non-smoking coaches. . . . The Southern has ordered 30 diesel units costing approximately $5,000,000, for delivery early next year. Receipt of these units will completely dieselize the road. . . . Exceptionally satisfactory results have been reported by the Western Pacific from its experiments with box cars equipped with Pullman-Standard Compartmentizers. As a result, 20 additional cars are now being equipped with the load separating device. . . . A. C. Goodyear, chairman of the board of the Gulf, Mobile & Ohio at New York, has been elected chairman of the executive committee. I. B. Tigrett, president, has been elected chairman of the corporation, and F. M. Hicks, executive vice-president, has been elected president.

BOWSER
ESTABLISHED 1885

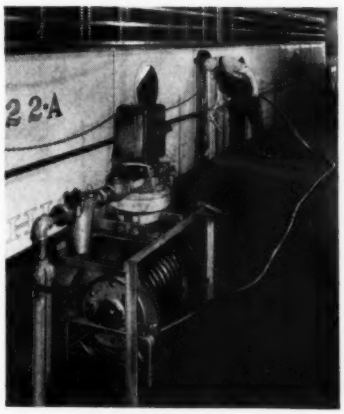
Headquarters for Liquid Handling Systems



Hi-speed fueling for diesel locomotives . . . up to 350 g.p.m. from each hose.



One-package diesel fueling or lube oil unit . . . in various capacity ranges. Compact . . . self-contained . . . easy installed or moved.

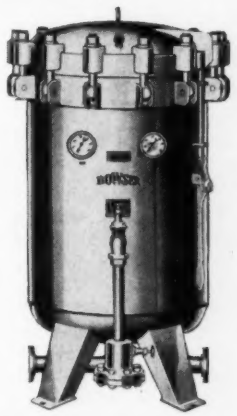


Complete metering system delivers lube oil direct to diesel crankcases.

COMPLETE ENGINEERING SERVICE

As the pioneer maker of equipment and systems for handling railroad liquids of many types, Bowser is prepared to furnish capable and dependable engineering service.

You are assured of complete satisfaction because Bowser supplies all the equipment and accessories necessary for proper installation . . . assumes the entire responsibility.



Uni-Pass dehydrator completely "dries" diesel fuel.

DIESEL FUEL FILTERS

Bowser filters guard against clogged injectors . . . reduce downtime . . . by removing micronically small particles not possible with conventional filtering media.

Consult with the Bowser man in your territory on any railroad liquid handling problem. There's no obligation. May we send you the Bowser Railroad Equipment Catalog?

Complete oil house metering systems, storage facilities . . . self-measuring pumps, drum drainers, barrel pumps, etc.

THE PIONEER MAKER OF EQUIPMENT FOR RAILROAD LIQUIDS

BOWSER, INC. 1323 Creighton Avenue, Fort Wayne 2, Indiana

Regional Offices - Atlanta - Chicago - Cleveland - Dallas - Kansas City
Los Angeles - New York - San Francisco - Washington, D. C. - Hamilton, Ont.

A one-man "work crew"...

Building an 800,000 cubic yard railroad fill across this valley in India, material was taken from borrow pits located on the hills. With hauls averaging 750 ft. one-way, and in temperatures of 110° to 140° F. Tournapulls delivered 65 cubic yds. an hour . . . 390 cubic yds. per 6-hour shift, twice as much as crawler-tractors.

Two 40 h.p. tractors, used for push-loading, serviced all 5 D Tournapulls. Loading time in hard, dry, root-filled, clay loam was less than ½ minute with 5-yard pay loads. On railroad work in this country, Tournapulls usually self-load 5 cubic yards, and when push-loaded in most materials carry 7 yards.

ATTACHMENTS and INTERCHANGEABLE EQUIPMENT

BULLDOZER BLADE

V-TYPE SNOW PLOW

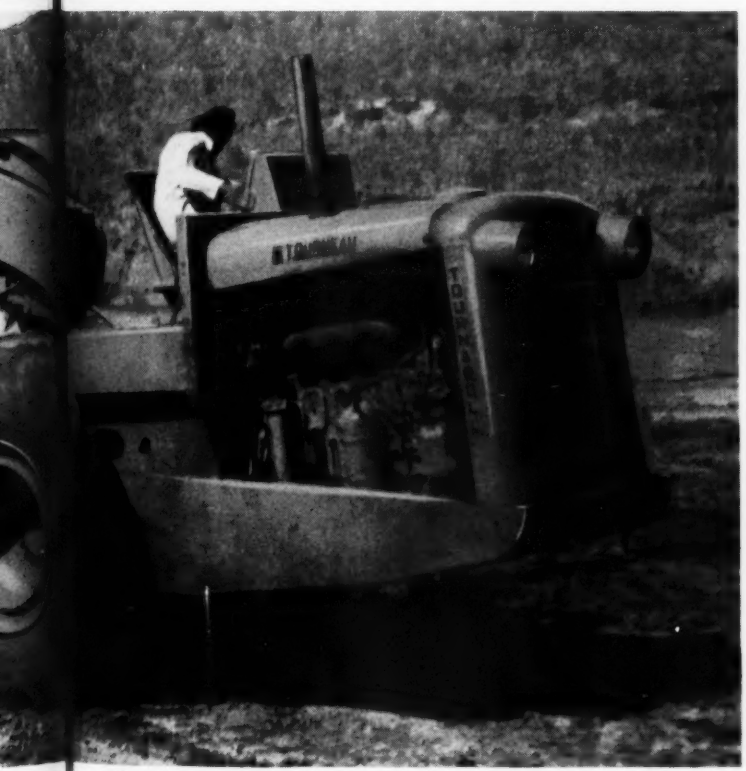
9-ton REAR-DUMP

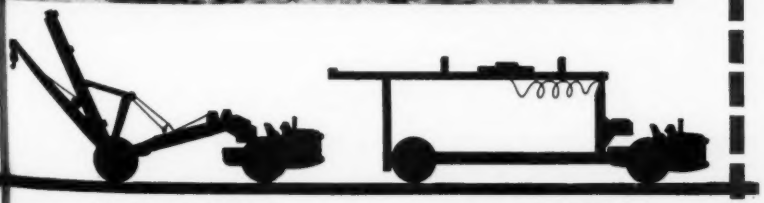
where and when you need it:..

28 m.p.h. D Tournapull speeds right-of-way maintenance

High-speed, rubber-tired D Tournapull is an ideal off-track maintenance tool. At a moment's notice "D" and its one operator can be dispatched to handle widely-scattered maintenance jobs. Rig travels anywhere at speeds to 28 m.p.h. . . . along right-of-way, over paved highway, or cross-country . . . needs no trailer transportation, no loading, unloading, or blocking. Big low-pressure tires take unit across tracks, ties, and switches without damage . . . eliminates planking.

Tournapull self-loads 5 yards, in most materials, loads 7 yards with pusher or, where two or more work together, can push or snatch load each other. It prepares new roadbeds . . . ballasts . . . repairs washouts . . . trims sideslopes . . . maintains bridge approaches . . . cuts drainage ditches . . . stockpiles or reclaims coal, etc.





10-ton CRANE 10-ton FLATBED

No interruption to train schedules . . . no running to siding. Tournapull merely drives out along side the track . . . returns to work the instant train is past. As an example of what D Tournapulls can do for railroads, read this production story from India:

Central Railways eliminate dangerous grades

To eliminate steep, dangerous grades on a 4-mile section of their line between Budni and Barkhera, India, Central Railways had to move 940,000 yards of hard, dry, rooted clay loam. About 85% of this yardage went into a fill across a single valley crossed by the right-of-way. Working in temperatures of 110° to 140° F., here's how 5 of these handy D Tournapulls economically handled this big production job:

Outproduce crawler-scrapers, 2 to 1

Loading on either side of the fill, each Tournapull heaped 5 pay yds. per load. Production records show that typical 1500′ cycles were completed in 4.6 minutes. Hourly output averaged 13 trips (65 pay yds.) per unit . . . production per 6-hour shift averaged 78 trips (390 pay yds.) per unit. Crawler-scrapers, working same cycle with the same supervision and same type of Indian operators, were outhauled by a 2-to-1 margin . . . moving only 37 loads per shift.

Write for the bulletin on this versatile 7-yard "D" maintenance tool. We'll be glad to arrange for a demonstration on your line . . . there's no obligation. Tell us where and we'll arrange to drive in soon.

Tournapull—Trademark Reg. U. S. Pat. Off. DP-122-

SEND NOW TO:

R. G. LeTOURNEAU, INC., Peoria, Illino

☐ *Please send catalog and specifications on D Roadster.*

☐ *Please contact me about demonstration near* .....

Name ..... Title .....

Railroad .....

Division .....

Address .....

City ..... State .....

Economical

WEED CONTROL SERVICE

Through Strategically Located Plants

Shown above are the eight Chipman Chemical Company weed killer plants in the United States . . . strategically located in major railroad centers to give you economical service, both in materials and application of chemicals. Also shown are plants operated by Chipman Chemicals, Ltd., the associate company in Canada. These plants afford economical, convenient servicing of Canadian lines.

Strategically located plants and a complete line of *proven* weed killing chemicals are two big reasons why you can get dependable, low cost weed control service . . . backed by 40 years of experience . . . from either of these two companies. Write today for further information and descriptive literature on the weed killers listed below.

ATLACIDE LIQUID & SPRAY POWDER • CHLORAX LIQUID & SPRAY POWDER
TCA-CHLORAX LIQUID • ATLAS "A" WEED KILLER • BRUSH KILLER

CHIPMAN CHEMICAL CO.

Manufacturers of
Railroad Weed Killing Chemicals Since 1912

58-FOOT REACH

. . . driving Monotube piles!

Inset shows long, extended pile being welded.
Project: Cleveland Memorial Shoreway
Engineers: Ohio State Highway Department
General Contractor: National Engineering and Contracting Company, Cleveland, Ohio

Standard Crane Reaches 58′ from Lake Erie Shore to drive 150′ Monotubes!

LIGHT weight and on-the-job extendibility—twin features of Monotube tapered piles—saved the expense of special rigs or heavy driving equipment on this project.

These *cold-rolled,* fluted steel Monotubes (standard 12″ butt diameter) were put down in sections, extensions welded on the spot, and—when completed to an average length of 150′—readily inspected from top to bottom before concreting.

Monotube piles are affording important savings on all types of jobs. Our engineers will be glad to consult with you. For complete information write The Union Metal Manufacturing Co., Canton 5, Ohio.

UNION METAL

Monotube Foundation Piles

One of the 160 Uses of CONCRETE on Railroads

NO. 10 OF A SERIES

This concrete power house on the Northern Pacific Railway in Minneapolis is an example of the modern, permanent structures railway managements are erecting today. They last longer and cost less to maintain than other types of construction.

Architectural concrete power houses are just one of more than 160 uses for concrete which enable American railroads to improve service and save time and money. The moderate first cost of such concrete improvements—plus their long life and low maintenance cost—result in ***low-annual-cost*** service. This saves money for other essential items.

PORTLAND CEMENT ASSOCIATION
33 West Grand Avenue, Chicago 10, Illinois

A national organization to improve and extend the uses of portland cement and concrete . . . through scientific research and engineering field work

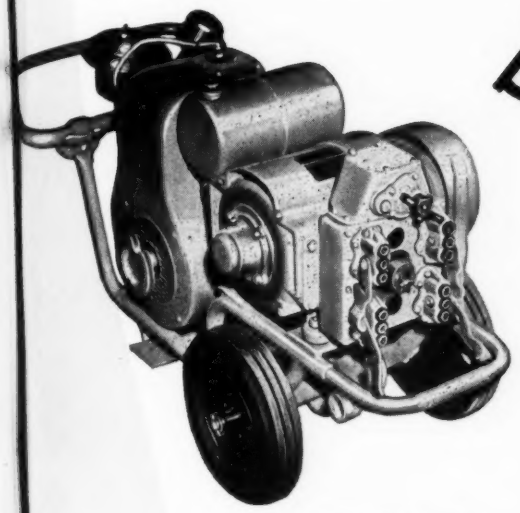
FINEST TRACK *at* LOWEST COST *in '5*

It's a SURE BET

IF YOUR BUDGET INCLUDE

JACKSON

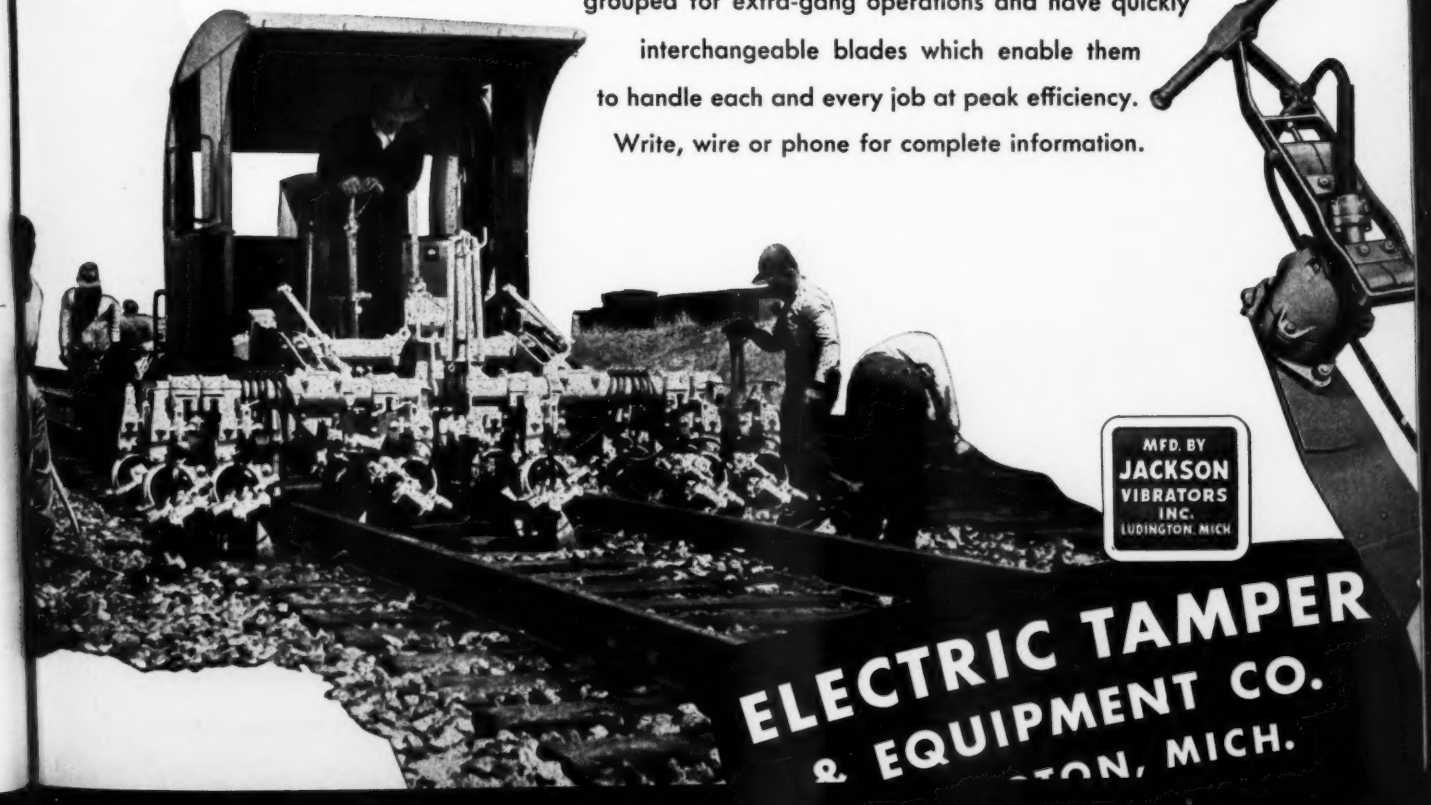
TAMPING EQUIPMENT



Model M-2 Power Plant serves 2 to 4 manually guided tie tampers. Rugged, compact and portable.

The experience of upwards of 60 leading roads and railro contractors leaves no logical room for doubt—the JACKSON MULTIPLE unrivaled in ability to put up the finest track at the lowest cost—regardl of lift or type of ballast. Just as efficient in very low-lift surfacing operatio this machine, in most instances, actually will save more than its cost ir single season.

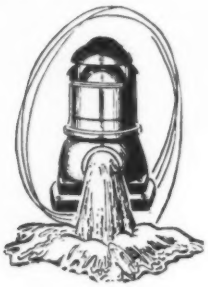
And for boosting section-gang productivity, there is nothing like JACKSO 4-tool outfits. They are easily portable, readily grouped for extra-gang operations and have quickly interchangeable blades which enable them to handle each and every job at peak efficiency. Write, wire or phone for complete information.



MFD. BY JACKSON VIBRATORS INC. LUDINGTON, MICH.

ELECTRIC TAMPER & EQUIPMENT CO.

WATER for Atlantic City's RITZ-CARLTON



DATA:

- —WELL; Drilled by rotary clay-seal process, 850 feet deep in the Kirkwood stratum; double cased and graveled.
- —CASING; 145 feet of 16" and 747 feet of 12" steel.
- —SCREEN; 61 feet of 6-guage Armco Iron.
- —PUMPS; Originally equipped with 4-stage 15" bowls with cast iron impellers. Later replaced with 5-stage 12" bowl and bronze impeller.
- —MOTOR; Original 25 HP electric still giving good service.

On Atlantic City's famous board walk, stands one of America's loveliest hotels—the Ritz-Carlton. Twenty-eight years ago, the owners turned to Layne for a well and pump installation. In the intervening years—over a quarter century, they have never experienced one fraction of disappointment in the dependability, durability and ever faithful performance of their purchase.

In the twenty-eight years of almost constant operation, the Layne unit has produced more than 1,471,680,000 gallons of water—all the fresh water needed by this great hotel. Upkeep expense since the day installed has averaged less than a hundred and seventy dollars a year. One amazing fact is that the original Armco iron screen is still functioning. Another is that the well was installed by a method that completely sealed off all infiltration of salt water in a most difficult salt water area. Such is the life expectancy, satisfactory operation and generally low upkeep expense of Layne wells and pumps.

For Water Well and Pump Catalogs, write to

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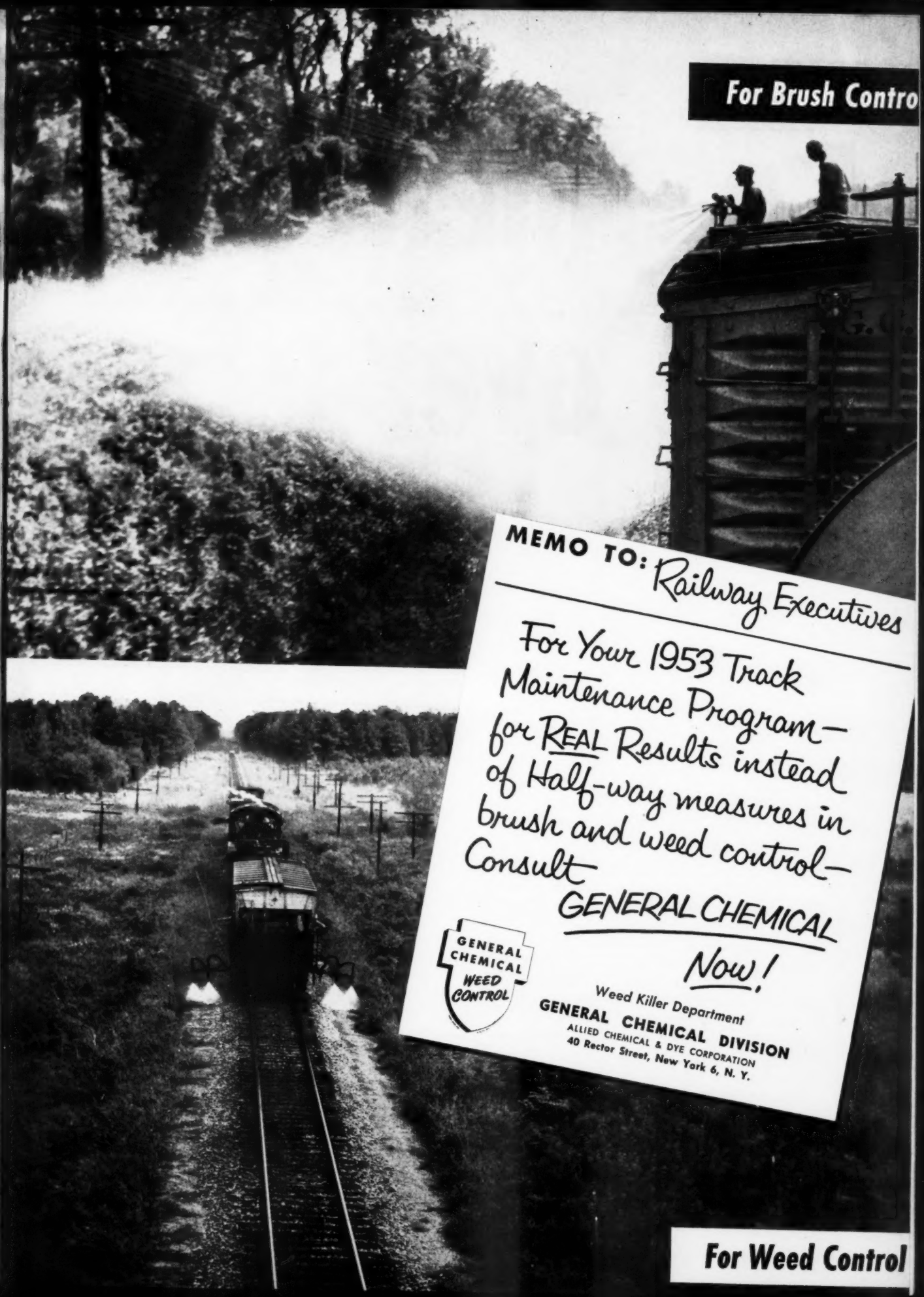
Layne

There are Layne Associate Companies located throughout the country. The one near you already understands the drilling and water bearing formations in your area.

WATER WELLS
VERTICAL TURBINE PUMPS
WATER TREATMENT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For Your 1953 Track Maintenance Program— for REAL Results instead of Half-way measures in brush and weed control— Consult
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ALLIED CHEMICAL & DYE CORPORATION
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For Weed Control

men over 45

More than six times as many men of your age will die of lung cancer this year as died in 1933, according to official reports. Though our research scientists are making every effort to discover the reason for this increase, they still don't know the answer.

They *do* know, however, that the lives of over half of those who will develop lung cancer *can* be saved . . . if they get proper treatment while the disease is still in the silent stage, before any symptoms have appeared.

That is why we urge you to have a chest X-ray every six months when you have your regular health check-up . . . no matter how well you may *feel*. Since only an X-ray can detect the "silent shadow" in its earliest stages, it is your best insurance against death from lung cancer.

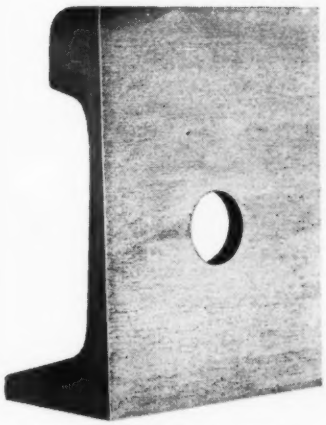
For more detailed information about this or any other form of cancer, call our nearest office or simply address your letter to "Cancer" in care of your local Post Office.

American Cancer Society

UNIFORM HARDNESS PATTERNS IN MILL END-HARDENED RAILS

Etched cross section view of the heat effected zone at the end of the rail. This zone will be a minimum of ¼" deep in the center extending outward to the sides as illustrated.

An etched oblique view of the heat effected zone of the rail end. This zone will cover the full width of the rail head and extend longitudinally a minimum of 1½" from the end of the rail.



An oblique view of an etched longitudinal section through the middle of the rail, depicting the depth and longitudinal length of the heat effected zone.

Employing the principle of Gradient Heating by means of gas fuels, a controlled hardness pattern is imparted to the rail end. Surface decarburization is very much less, due to the short time the metal is at heat in the presence of a protective atmosphere.

This process produces a hardness of 331 to 401 BHN at a spot ¼" to ½" from the end on the center line of the rail head. The hardness shows a gradual transition from this point to the normal rail hardness. These gradual transition zones create tough, impact-resisting structures below the surface and enhanced fatigue strength.

The metallurgy of the rail, its dimensional precision and physical characteristics are rigidly controlled at CF&I's modern rail mill.

You are cordially invited to visit the CF&I Pueblo Plant to inspect these facilities.

RAILS AND ACCESSORIES

THE COLORADO FUEL AND IRON CORPORATION

DENVER, COLORADO

CF&I

1057

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DEARBORN ANNOUNCES NEW

NON-CHROMATE

DIESEL COOLING WATER TREATMENT

Developed to Prevent Destruction of Valuable Diesel Engine Parts

Unretouched photos show damage to cylinder liner caused by improperly treated cooling water. This erosion appeared after only six months'service.

Water side erosion of cylinder wall of large diesel engine.

Corroded impeller which required replacement after short service life.

Railroad men asked for it! Dearborn now supplies it! It's Dearborn's NEW, NON-CHROMATE DIESEL COOLING WATER TREATMENT No. 527. Completely safe, this new Dearborn treatment provides superior protection for all metals *—including aluminum—* that are found in diesel cooling systems.

Thoroughly Tested

Dearborn chemists began developing this non-chromate treatment five years ago. Today, after thorough research and exhaustive field tests by several prominent railroads,* Dearborn NON-CHROMATE TREATMENT NO. 527 is ready to help you reduce maintenance expense on your valuable diesel equipment.

*Specific Data Furnished on Request.

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Merchandise Mart Plaza, Chicago 54, Ill.

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Position.....

Railroad.....

Address.....

City.....State.....

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Effectively SEAL OUT MOISTURE and DIRT!

Special 1/16" thick sealer is applied only to bottom side of FABCO Self-Sealing TIE PADS.

FABCO *Self-Sealing* TIE PADS

Maintain a Lasting Bond Between Pad and Tie

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Our 18 years in the railway field convinced us that a tie pad must have extreme *durability* and *long life*. FABCO TIE PADS have fully demonstrated their great superiority in this respect . . . and because of their extreme *durability* and *long life*, their final cost — as well as their initial cost — is low.

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FIVE SPECIAL FEATURES

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3. **Special coating is firmly adhered chemically to the pad without decreasing the strength or resilience of the pad.**
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5. **Self-Sealing pads require no more labor for installations than FABCO Uncoated TIE PADS.**

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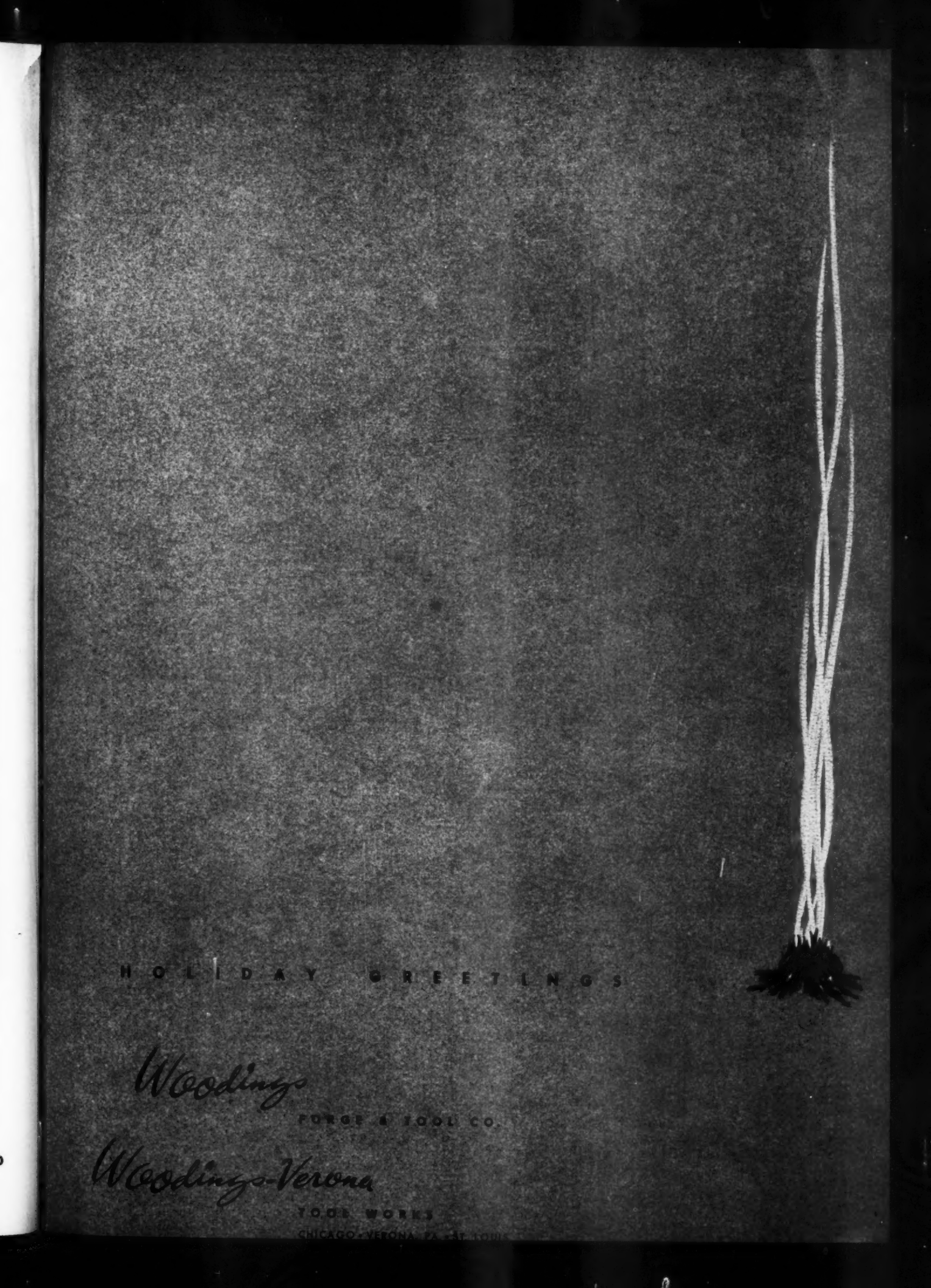
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READER SERVICE DEPT.

"TIMKEN® bearings eliminate wear on differential axles," *says Northwestern Motor Company*

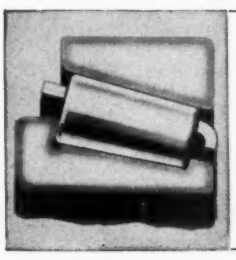
THIS Northwestern Motor Company model 532R light service car is built to take the daily wear and tear of right-of-way maintenance with minimum time-out for upkeep and repair. To insure trouble-free performance and availability all 'round the clock, Northwestern engineers mounted the wheels and axles on double-row Timken® tapered roller bearings.

With Timken bearings on its wheels and axles, the 532R spends less time in the repair shop. Maintenance costs are reduced. Due to their tapered construction, Timken bearings carry both radial and thrust loads in any combination. True rolling motion and incredibly smooth surface finish of Timken bearings minimize friction. Higher speeds are possible, wheels turn smoothly, effortlessly. Wheel gage is accurately maintained.

No other bearings give you all the advantages of Timken bearings. Make sure they're in the equipment you build or buy. Always look for the trade-mark "Timken" stamped on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ont. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.

NORTHWESTERN MOTOR COMPANY mounts the wheels and axles of its model 532R light service car on Timken bearings to eliminate wear.



GREATER LOAD AREA

Because the load is carried on the *line* of contact between rollers and races, Timken bearings carry greater loads, hold shafts in line, wear longer.

The Timken Roller Bearing Company is the acknowledged leader in: 1. advanced design; 2. precision manufacturing; 3. rigid quality control; 4. special analysis steels.

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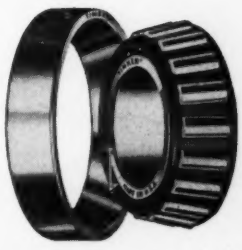

NOT JUST A BALL ○ NOT JUST A ROLLER ⊂ THE TIMKEN TAPERED ROLLER ⊃ BEARING TAKES RADIAL ◫ AND THRUST ⊣◫⊢ LOADS OR ANY COMBINATION

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CLEANING BALLAST *on your Railroad*

we stand on our record

Just Ask the Railroads That have used us!

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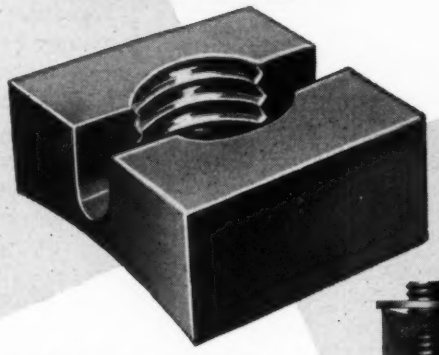

Specify Lewis Loktite Speed Holding Nut #2 for positive lock . . . no other nut required. Equals tensil strength of bolt. Trimmed sides provide a close wrench fit. *For Double-Life, fewer replacements, specify Hot-Dip Galvanized finish!*

Side view, reduced, showing areas of friction lock.

See your Lewis representative, or contact factory for further details.

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the finest in RAIL ANCHORS

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YOUR **EXTRA EMPLOYEE** THAT WORKS WITHOUT PAY

RACINE *Portable* RAIL DRILL

BUY DEFENSE BONDS

- LIGHT IN WEIGHT -- 165 lbs.
- EASY TO HANDLE
- POWERFUL -- FAST
- FITS ALL RAILS
- AUTOMATIC POWER FEED

See this modern, gas-engine powered rail drill. A machine built to machine tool precision standards. It is a rugged, accurate drill press on horizontal lines.

Light in weight, mounted on rollers, without outboard supports, this machine can be handled and operated by one man. Husky, quick-acting clamps hold the machine securely on the rail and provide quick removal to clear traffic. Finished holes can be produced in one to two minutes depending on drill size and web thickness. Handles all size drills. Special type *automatic power feed* insures a predetermined drilling time per hole. Definite output per man-hour can be established. Write today for Free 3-color catalog.

WRITE DEPT. SM5 FOR FREE SAMPLES

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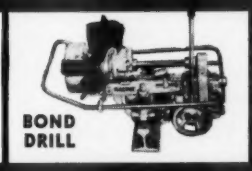

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KOPPERS TIE-SEALING COMPOUND being applied by gun. It protects ties against premature failure caused by splitting, checking or cracking. Covering of fine stone is an added armor against fire.

How to Prevent "Middle-Aged Spread" in Bridge Ties

● Unless retarded, splits and cracks in bridge ties spread, thus exposing hearts of ties to decay.

That is why, early in the service life of ties, all openings should be filled in with Koppers Tie-Sealing Compound. This specially-processed coal-tar coating seals up splits, cracks and checks. It retards their spread and protects ties against decay and premature failure.

It is estimated that Koppers Tie-Sealing Compound will increase service life of bridge ties by at least five years. Apply it on your bridge ties and get these *extra* years of service.

Use Koppers Tie-Sealing Compound on your railroad system. Details and price information on request.

KOPPERS

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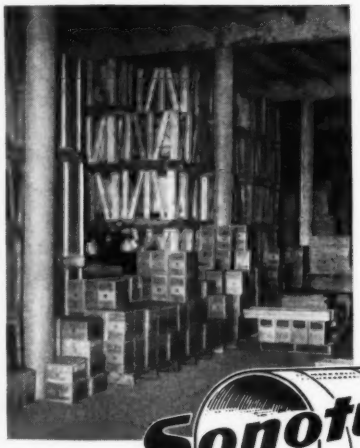

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SPEED RAIL WORK WITH NO INTERRUPTION OF SERVICE

ON
Lining crossings, switches.
Renewing insulated joints, end posts.
Pushing, pulling continuous rail.
Controlling expansion.

Simplex No. 550 RAIL PULLER AND EXPANDER

Works on outside of rail—Operated by one man to replace rail pounding crew—Eliminates battered rail ends, bolts, crossings.

Simplex No. 550 (25 tons capacity) Rail Puller and Expander has alloy steel, heat treated U-Bar to stiffen the joint. Lever socket "locks down"; nothing protrudes above rail. The U-Bar fits all rails measuring 3¼" or more from under ball of rail to flange at top of web—special bars available for smaller rail.

A time-saving, work-speeding tool to improve maintenance efficiency. Also available in 30-ton capacity. Write for specifications and prices.

Simplex LEVER · SCREW · HYDRAULIC Jacks

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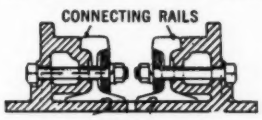
THERE IS A BETTER FROG!

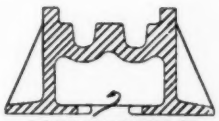
it's the "universal" frog

Better than conventional types because...well, look at the picture and diagrams. Notice the one-piece construction that means greater strength and rigidity. You can see how the elimination of numerous parts simplifies application and handling. Then there is the Universal Frog *exclusive*...tie plates cast integral with frog . . . rail supports cast integral on both ends of frog.

The Universal Frog cuts down maintenance costs. One-piece construction means no loose joints, eliminates extra parts. Made of alloy electric cast steel, the LFM Universal Frog adapts itself to low cost electric or oxy-acetylene welding on track or in shop. This material increases in hardness with service.



RAIL—SUPPORTING SHELF



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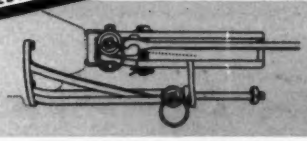

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No. 288 of a series

Railway Engineering and Maintenance

SIMMONS-BOARDMAN PUBLISHING CORPORATION
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Subject: Our Statistical Activities

December 1, 1952

Dear Readers:

About this time of the year our office begins to look and seem more like a statistical bureau than it does an editorial shop. This is so because of a practice we have had for a long time of compiling data near the close of each year on which to base estimates of railroad construction and maintenance activities for the current year and for the period immediately ahead. I thought you might be interested in knowing something of our activities in this regard, and the reasons for them.

This work really begins each year in September when Henry Michael starts compiling his mailing list in preparation for sending out letters to practically all railroads in this country, Canada and Mexico, requesting information on the amount and types of improvement work done by each company during the year. Along with this same letter he asks for data on the number and types of maintenance-of-way work equipment purchased by each road. Since this letter goes to practically every railroad in the three countries regardless of size (483 letters went out this year) the work of compiling, classifying and analyzing the data as they come in is a big job for a small staff. At about the same time another editor is sending out a request to all the larger Class I roads for information on the extent of their rail and crosstie renewal programs for the present year, and also on those planned for the coming 12 months.

The principal purpose of all this activity is to obtain the statistical basis for articles to be prepared for the Annual Review and Outlook Number of the Railway Age, which is published immediately after the turn of the year, and for the January issue of Maintenance. Among the statistical material printed in the latter issue each year is an article giving a breakdown of the number and types of M/W power machines purchased during the previous year.

To some people these statistics may seem pretty dry, but to us they literally pulsate with life and significance. As the figures begin to roll in we are able to start building a picture of the amount and character of activity in our field, and as this picture takes shape for the coming year it is like raising a curtain hiding the future. I am sure the published figures are of as much interest to you as they are to us, and I know that many manufacturers find them invaluable in making their plans for the coming year.

One of the facets of this work in which we take particular pride is the record we have compiled of annual work equipment purchases, which dates back to 1937. This is the only record of its kind available anywhere. It is invaluable to us in answering queries from manufacturers regarding the magnitude of the market for particular types of work equipment and machines. With the actual figures before us we can give factual, precise answers to these queries; there is no guessing involved and no necessity for using approximations based on figures from a small handful of roads. Many are the manufacturers who have had occasion to use our summaries of annual work-equipment purchases.

This discussion would be sadly lacking if it did not include a word of appreciation for the splendid help we have had from the railroads in our statistical endeavors. Without their cooperation it would not be possible for us to carry on this work — work which makes it possible for us to render a valuable service to our readers and to the manufacturers who are so eager to serve them.

Yours sincerely,

Merwin H. Dick

Editor

MHD:lw

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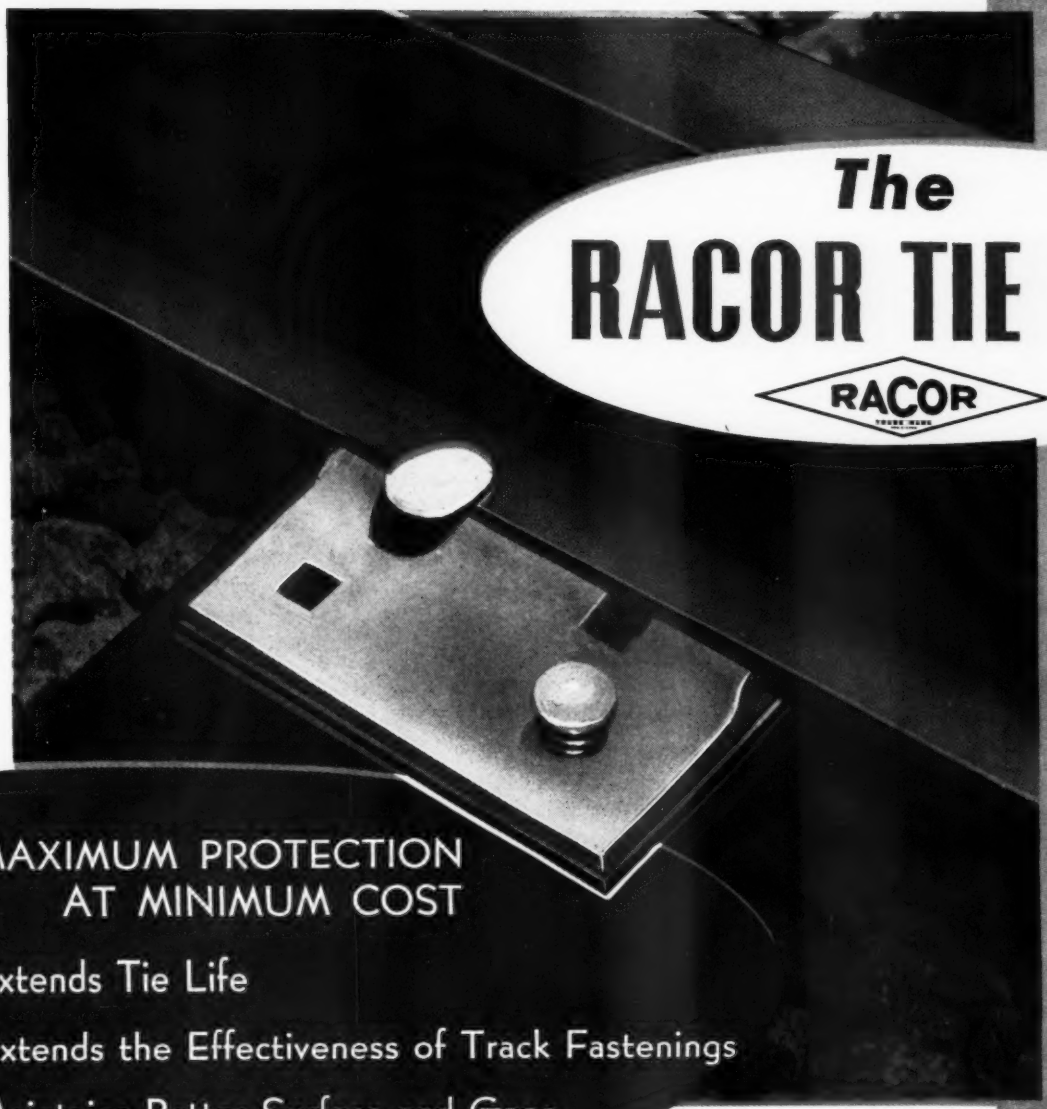

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Lifts Ties like Matches

UP THEY COME—Railway ties salvaged from an abandoned second main line, scooped up from the slag ballast, gathered together in bundles by the remarkable one-man unit.

International crawler with new skid loader scoops up ties from 60 miles of Southern track

When the Southern Railway installed centralized traffic control on one division recently, it became possible to remove 60 miles of rails from second main-line track. Then the Southern wondered how to recover 180,000 ties from the same section.

They found that when it comes to salvaging ties, there's nothing made to match the new skid loader mounted on a rugged International crawler.

A TD-14A crawler with skid loader was put to work, scooping up the ties with reinforced skids, and holding them secure with the machine's claw-like top grab arm. The bundles of from 20 to 25 ties were banded with steel tape from special tape reels mounted on the skid loader frame.

Result: 2,900 ties dug up and tied in bundles each 8-hour day.

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The Tie Problem—

Caution Needed but Not Procrastination

The knowledge required to lick the problem of mechanical damage to crossties is gradually being accumulated. Practically every railroad of any size is attacking this problem individually, and in addition they are working on it collectively through research projects sponsored by the American Railway Engineering Association and the Association of American Railroads. But this is not all; literally scores of supply companies are offering devices or materials for preventing or minimizing the various types of mechanical damage, and still others are giving thought to the possibility of entering this field.

Actually, however, very little progress has been made to date in the general application of measures for bringing under control this dollar-consuming enemy of tie life. There are a number of reasons for this situation. One is the scope and complexity of the problem. There are at least a half dozen different types of mechanical damage, each of which requires a different remedy. Adding to the complexity of the problem is the fact that each of the types of damage occurs in different degrees in the various species of wood from which ties are made. Then there is the matter of making a selection between the different kinds of protection offered for particular types of damage, i.e., whether to use tie pads or hold-down fastenings to prevent tie-plate cutting. Finally, and permeating all aspects of the problem, is the matter of the economics involved. In other words, will the increase in tie life be sufficient to justify the cost of the protection applied?

The stakes are large in this matter of prolonging tie life. Hasty action in applying protective measures could be costly if the wrong decision is made. To avoid such a contingency a cautious, carefully planned approach is necessary. An example of such an approach is the Santa Fe's program, as described by Chief Engineer Blair in an article elsewhere in this issue, to determine the precise causes of failure by inspecting ties after they are removed from the track. As a consequence of this program he states that "we are getting our problem defined."

If it is true, as stated above, that the hasty selection of a remedy that might turn out to be ineffectual in the long run could prove costly to a railroad, it can be said with equal truth that failure to take action would also be costly, because the destroyers of tie life then continue to operate unmolested. Here again the Santa Fe sets an example by losing no time in putting into effect protective measures of a type and character indicated by its analysis of the causes of failure.

One of the aspects of this problem that adds to its difficult nature is the fact that many years may elapse before definite conclusions can be drawn from service tests. It is pertinent to inquire whether it is necessary to wait until a test has run its full course before at least tentative conclusions are drawn and put to use. While in no wise retreating from the point of view that a degree of caution is needed in selecting corrective measures, there is no question but what this attitude can be overemphasized. Ordinary prudence dictates that at least some specific data must be available on the effectiveness of remedial measures before they can be applied. But at what point along the way does prudence become procrastination?

ROADWAY EQUIPMENT—

Misuse Is Sheer Wastefulness

SEEMINGLY insignificant infractions of good practice in handling work equipment "can run into a major and unnecessary waste of material and manpower," according to a subcommittee report of the A.R.E.A. Committee on Maintenance of Way Work Equipment just published in the association's December Bulletin. That report, aimed primarily at means of conserving labor and material, has been acclaimed by committee members as one which deserves the attention of all railway personnel who operate or maintain roadway equipment, and especially those who supervise such men.

Brief as the report is, it carries a terrific wallop, if all the facets of its implied directives are observed. For one instance, it points out that the only way to prevent misuse of equipment is by an educational program that "adequately trains each machine operator so that he really knows how to use and care for his machine." Into that one sentence is built a major portion of the hopes and dreams of each superintendent of work equipment in the country. To get such a training program authorized by his supervisory officers and sanctioned by the labor unions is one of his greatest aims. To date little but frustration has resulted from all his efforts. But he will never give up hope, for he knows that until he secures an adequate and workable system of training equipment operators—one that is equitable to both employer and employee—machines will be misused, waste will continue and fewer dollars will be available to buy replacement machines or employ more men. Nowhere else in railway employment does a greater opportunity exist for labor and management to secure mutual benefits through cooperation.

For a second instance of the report's impact, consider the list it gives of 10 ways in which operators, in handling equipment, can reduce waste: (1) Protect it from the elements; (2) lubricate it properly; (3) give it sufficient field maintenance; (4) adequately protect field repair parts from the weather; (5) do not operate a machine that is in need of minor adjustments or which has minor defects; (6) do not man-handle a machine in getting it on or off the track; (7) protect it adequately from cold temperatures; (8) always use the right lubricants; (9) never use dirty containers when handling fuel and oil; and (10) protect it well against damage during shipment from one point to another.

Many of those instructions cover comprehensive good-practice programs in themselves. If all were to be observed few breakdowns would result. As one committee member has remarked: "That list should be made the Ten Commandments by which all machine operators are judged, for if an operator does not observe them, he will be unable to live in peace either with his associates or his machines."

Finally, the report points out that equipment is being used to an ever-increasing degree because it can produce a large quantity of high quality work. It warns, however, that employees are sometimes tempted to emphasize quantity without regard to quality, thus producing work that does not last as long as it should. The elimination of such waste is a prime obligation of all supervisory employees.

DERAILMENTS—

Are Increasing from Snow and Ice

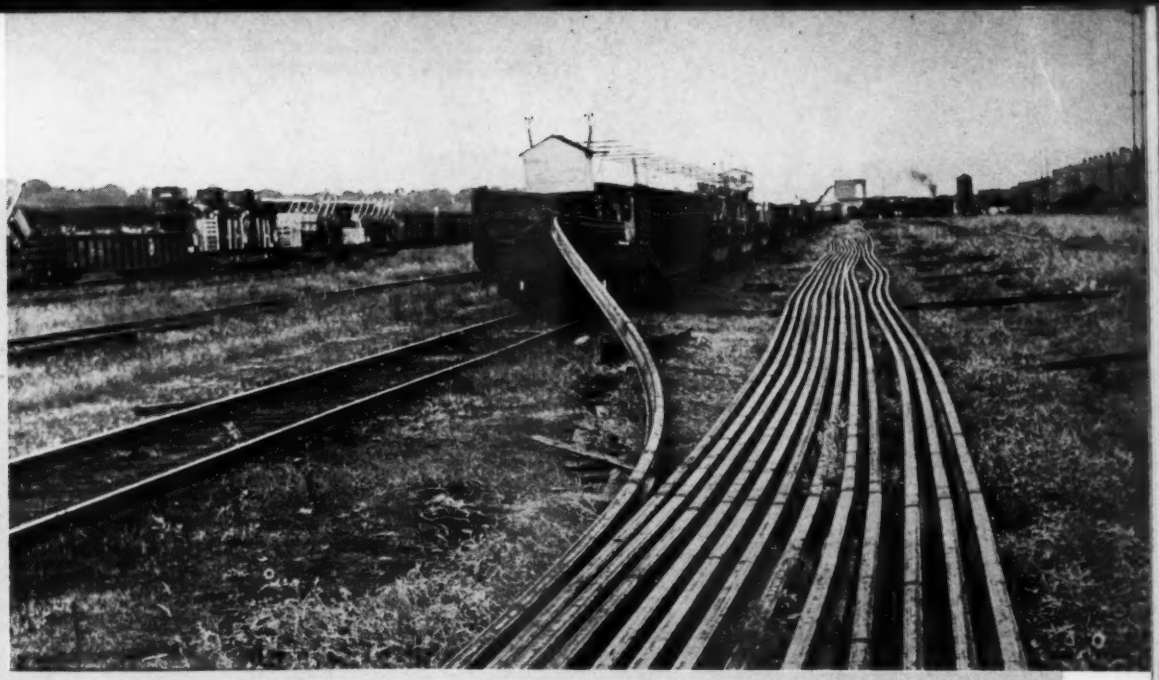
ALTHOUGH many railroad supervisory officers may not be aware of it, there were twice as many train accidents caused by snow and ice on tracks in 1950 (the last year for which figures are available) than occurred ten years previously in 1941. This is revealed by the I.C.C. Accident Bulletins. This increase is somewhat surprising because the number of diesel locomotives in service has constantly increased during this period and it would seem logical to believe that the heavier wheel loads on diesel units would crush ice and stones much easier than the lighter loads on pilot wheels of steam locomotives. So possibly, we should look elsewhere for the cause of the increase in such derailments.

While train derailments caused by ice and snow could happen anywhere on a railroad, the most probable locations are in cuts and at highway crossings, turnouts and railroad crossings. Cuts can be cleaned by snowplows and flangers, and this equipment is kept in operation as long as the storm requires. Switches, frogs and railroad crossings can be swept clean or otherwise protected, and are usually policed as often as necessary during storms to assure their satisfactory operation. On the other hand, the flangeways at highway crossings are the most difficult to control. Within minutes after they have been cleaned out they will often become fouled again by the passage of vehicular traffic.

Probably the greatest offender in this respect is the highway snow-fighting equipment which, in its passage over the tracks, picks up stones along with the snow and ice and drops them in the flangeways. Unless the operators of this equipment stop their machines each time after crossing over a railroad and clean out the flangeways, there is always the existing possibility of a serious derailment.

The only solution seems to be to solicit the cooperation of the highway authorities in issuing instructions to their operators regarding the proper precautions that should be taken when running such equipment across railroad tracks. A suggested list of such precautionary measures was framed by a subcommittee of the AREA Committee on Highways in 1941 and this list is now part of that association's Manual.

Unquestionably most supervisors have, at one time or another, contacted the responsible highway authorities in their territories, and have received promises of cooperation. It would seem, however, with the personnel constantly changing in the highway departments, that new contacts should be made by track supervisors with these men to imbue them with a fresh apprehension as to the danger of causing train derailments.



FOR THE FIRST eight or nine car lengths, the rail, being anchored by its own weight, literally loaded itself when the cars were backed up. However, when this much of the rail was aboard, the portal frame then came into play to provide the necessary anchorage. Note the lateral distance from which the long rails were loaded in this operation

CRI&P Works Out New Variation in Loading Welded Rails

Employing a locomotive crane to lift welded rails and a special frame for holding the ends in position, the CRI&P loaded the strings direct from the storage pile onto cars by merely backing up the work train.

• It is one thing to load a length of continuous rail from between the running rails by backing a string of cars under it. It's quite another to load such rails in the same manner directly from a storage pile alongside the track. But that's what the Chicago, Rock Island & Pacific did, and successfully, when it was recently confronted with the problem of loading 36 lengths of welded rails at Silvis, Ill.

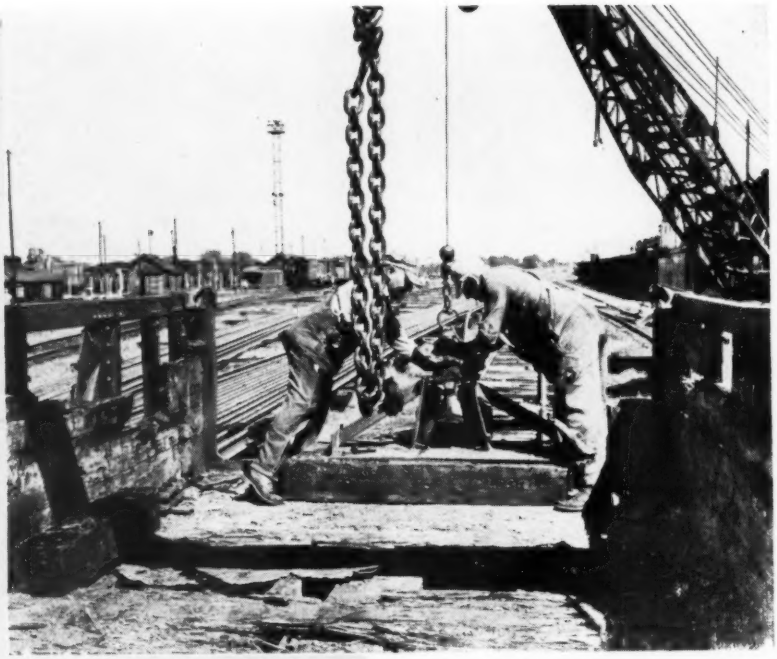
The rails to be loaded had been welded in the conventional manner by the Oxweld pressure process. These strings for the most part were each made up of forty 132-lb. Class I rails, 39 ft. long, although some of the strings were shorter for fitting between the insulated joints, turnouts and crossovers that were involved in relaying the eastbound main track from Mile Post 101.13 near Peru, Ill., to Mile Post 106.13 near Spring Valley. The rails used for this purpose had blank ends where they were to be welded together but the rails at the extreme ends of each string were drilled for 6-hole bars.

Since the relay site was about 70 miles from the welding plant at Silvis, the rails had to be transferred on cars, and 21 flat cars and 8 gondolas were assigned to this service. A "needle-eye" roller arrangement, through which the strings of welded rails would be threaded while loading, was mounted on the end of the rear car. Also, several timbers were placed across the floor of each car to serve as skids for the welded rail.

After welding, the strings of welded rails had been set on greased rail skids for storage between two widely separated yard tracks, and at the time of storing them the rails had been pulled up so that the ends were squared up at one end of the storage pile. Also, the identity of each length of welded rail was marked in accordance with a previously prepared plan on the ball of the rail at the head end of the storage pile to aid in picking up the strings in the proper sequence.

For use in loading the long rails a heavy portal-type frame was constructed to straddle the loading track at a point just in advance of the head end of the storage pile where the ends of the welded lengths had been squared up. The portal frame consisted of a transverse horizontal member supported at each end about 12 ft. above the rails by an A-frame. The horizontal member was a heavy bridge timber reinforced along its four corner edges by secondhand steel angles and along the sides by pieces of rail. The A-frame supports also consisted of heavy bridge timbers bolted together. Extra timber legs were built on the sides nearest the storage pile and cable ties and anchors were installed for anchoring the frame in the opposite direction. A double

AFTER WELDING, the rails were stored on greased skids until needed for rail relay. This view shows the empty gondolas and flat cars with timber skids in place and wedged along car floors. The crane, in this instance, is pulling the strings closer to the loading truck



THE LOCOMOTIVE CRANE picked up the end of each welded rail to be loaded and swung it over the loading track, after which the train was backed up and two men threaded the end of the continuous rail through the needle-eye mounted at the end of the last car

length of heavy chain was fastened to the overhead horizontal member and, at its lower end, it carried a heavy clevis for attachment to the drilled ends of the welded rails.

The first step preparatory to loading the rails consisted of pulling the welded rail strings closer to the loading track. This work was done by a 25-ton locomotive crane by hooking a clamp and cable at about 150-ft. intervals under the base of a rail and pulling it, along with five or six others, closer to the track.

The crane then was positioned near the head end of the storage pile on a track adjacent to the loading track, and the train of cars was moved so that the needle-eye roller arrangement of the last car was spotted under the overhead member of the portal frame. The crane lifted up the end of the first welded rail string to be loaded and swung it to the center of the loading track. The train was carefully backed up so that the end of the welded rail could be threaded through the needle-eye. When this had been done, the train was slowly backed until the needle-eye was about at the point where the crane rail tongs gripped the rail. The tongs were then transferred to the other side of the needle-eye and the train was backed up a little farther. The crane then lifted the end of the welded rail so that the clevis at the end of the chain fixed to the overhead member could be fastened to the rail end.

The train was then slowly backed up, thus forcing the welded rail length through the needle-eye onto the cars. It was noted that, for the first eight or nine car lengths, there was sufficient weight to the welded length remaining on the ground skids to actually force-feed the rail through the needle-eye onto the cars as the train backed up, even though the rail lay some distance away from the loading track. However, after the needle-eye passed this point, the anchorage came into play, holding the rail end in position while the string of cars was pushed under the remaining length. The train was then pulled ahead until the needle-eye was again under the portal frame, and the loading process repeated until 14 rails had been loaded. A heavy shimming timber was then used to raise the needle-eye roller arrangement. Wood parting strips were placed over the first layer of rails and against the car side stakes, and another layer of 14 rails was similarly loaded. This was followed by another layer of wood parting strips and the remaining welded rails.

Only a crane operator and three laborers, directed by the assistant supervisor of work equipment, were employed in addition to the train crew in this loading operation. One laborer worked on the ground attaching the rail tongs onto each string of welded rail being loaded and walked along with the needle-eye, watching for any trouble that might occur as the welded string was being lifted from the ground skids. The other two men threaded the rail end through the needle-eye, transferred the rail tongs to the other side of the needle-eye, attached the clevis to the rail end, and moved the position of the chain hitch along the overhead member as required so that each rail length rested in its final loading position on the cars without the need of being lined over. These two men necessarily walked the length of the train on the cars, watching the performance of the anchorage and to be available for any adjustment of the chain hitch, as well as for squaring up the ends of the rail strings on the car nearest to the locomotive.

This method of loading long rails directly from the stock pile proved satisfactory in every way. The rigidity of the portal frame gave it a definite advantage over a locomotive crane as a means of anchoring the rail ends during the loading procedure. No difficulty was experi-

← LEFT

WITH THE RAIL THROUGH THE NEEDLE-EYE, the train was backed up a little farther and the end of the continuous welded rail was fastened by a clevis to a heavy chain hanging from the overhead member of the A-frame. The chain was attached in such a manner that it could be moved from side to side of the cross member so as to guide the rail to desired position on the cars

↓ CENTER

THE ROLLERS of the needle-eye, seen smoking from the heat in this view, took a great deal of punishment. Although the rollers were hard-surfaced three sets were worn out during the loading of the 36 strings of long welded rails

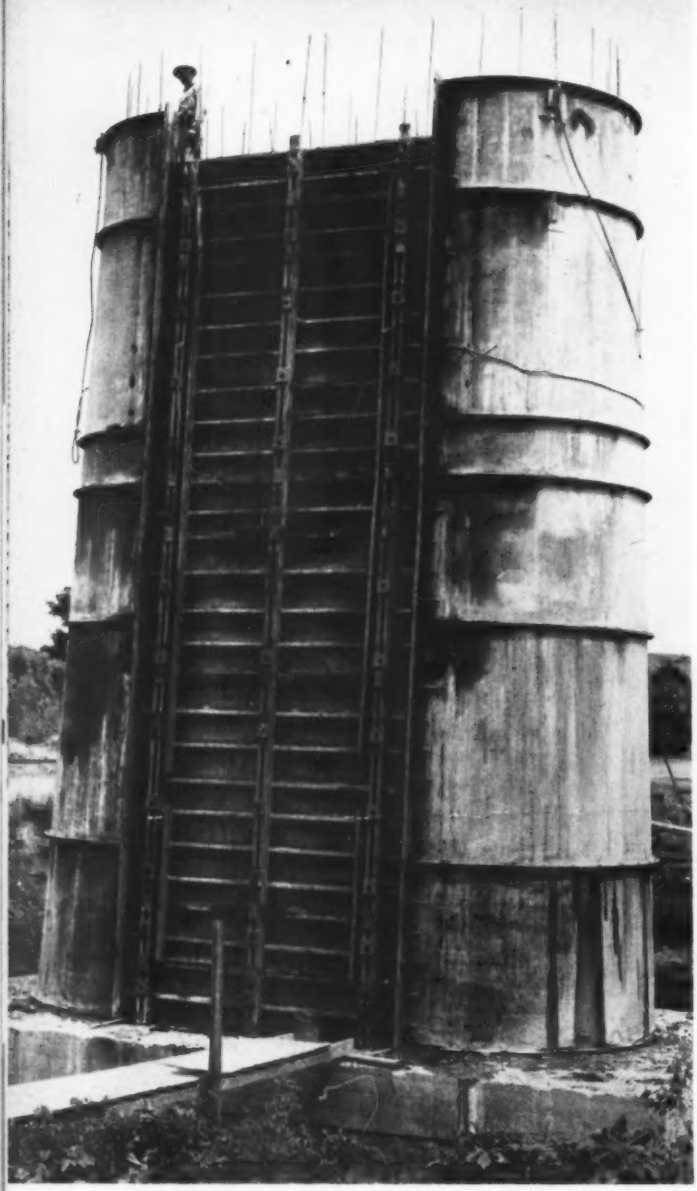
↓ BOTTOM

THE STRINGS of welded rail were guided into their final loaded position by the locomotive crane. The overhead cross member of the portal frame must be extremely strong to withstand the heavy drag of the welded string. In this view, one of the workmen is signaling the work-train engineer in order that the rail ends will be squared up

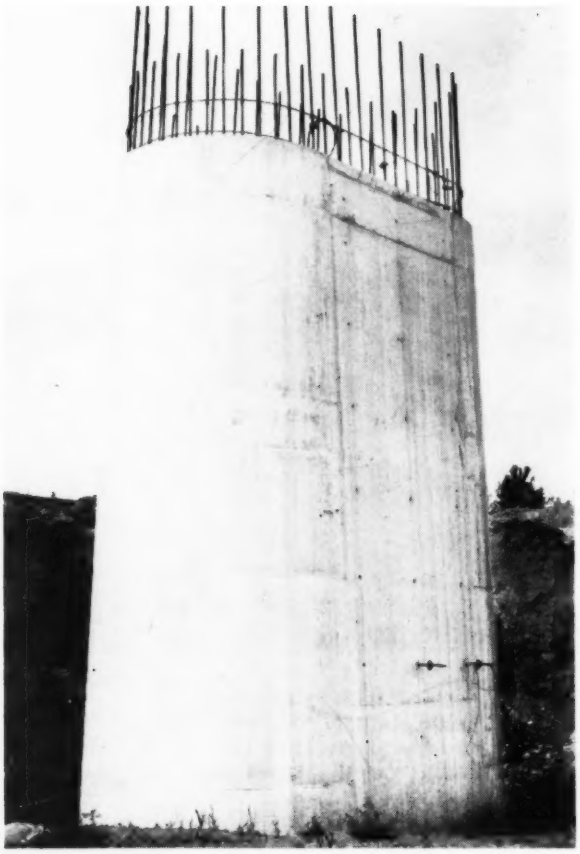
enced in getting the rails to move onto the cars, even those that were the farthest from the track. In fact, it was observed that the lateral reverse curve that was formed in each rail while it was being loaded had a tendency to keep the rails from overturning, a difficulty that is sometimes experienced when long rails are loaded from a position between the rails of the loading track.

After all the rails had been loaded, the train was moved to the rail-laying site and each welded rail was unloaded in its planned position. A 40-ton locomotive crane was used in this work. The end of each welded rail was threaded through the needle-eye and then fastened to the drawbar of the crane. The train then pulled away from the crane, thus pulling the cars from beneath the rails. By forcing the boom hard over to the left (or right) of the track the welded strings were caused to settle outside of the running rails they were to replace. An old car channel, about eight feet long and projecting downward, was fastened to the end of the needle-eye car to lower the end of each welded rail gently to the track, thus preventing possible damage to the rails or to the car hoses.

This procedure of handling the welded rails was worked out under the general direction of W. B. Throckmorton, chief engineer, and J. T. Fitzgerald, engineer maintenance of way. F. A. Williams, assistant supervisor work equipment, had direct charge of the field work.



THE PIERS were poured in two lifts. This view shows the lower section of the steel forms resting on the massive concrete footing and ready for installation of the form ties. Steel reinforcing for the pier shafts was pre-assembled on the ground and the cage was set in position on the footing prior to erection of forms



WHEN THE CONCRETE had sufficiently hardened, forms for lower section were dismantled and sections moved to next pier location for reuse. This view shows the locations of the few high-tensile form ties that were used in the center panels only. Two of the she-bolts, which have been left in place, indicate the tie locations

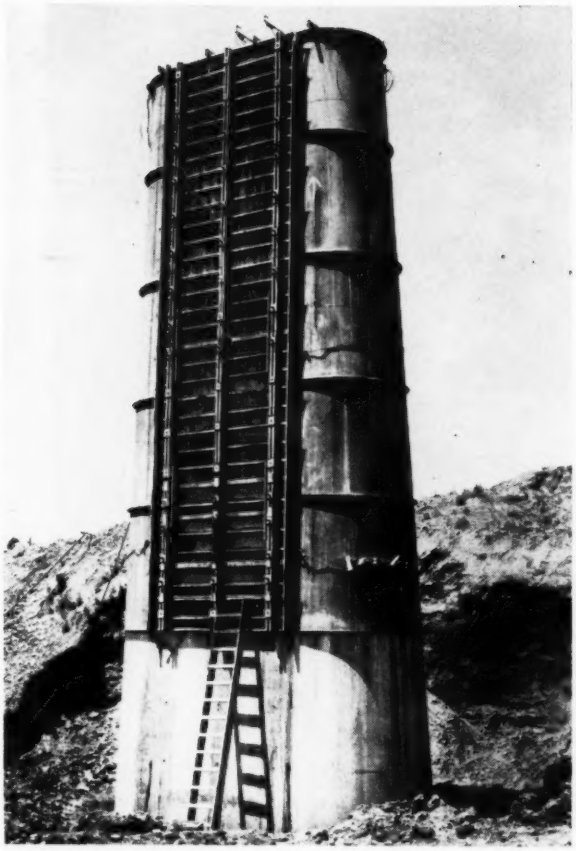
Bridge Features Use of Steel Forms for

• A new railway bridge is being constructed over the Missouri river near Chamberlain, S.D., to carry the main track of the Chicago, Milwaukee, St. Paul & Pacific over that river at a point about 9,000 ft. down stream from the existing structure. This bridge is being erected because of the construction of Fort Randall dam by the U.S. Corps of Engineers, which will cause inundation of the railroad facilities in their present location. One of the interesting features in the building of the new bridge is the use and reuse of sectional steel forms for the construction of two abutments and 33 piers of reinforced concrete.

For years the U.S. Corps of Engineers has resisted the use of steel forms for concrete pier work paid for out of federal funds, because it was held that bulging of the forms after repeated use produced unsatisfactory results in the final shape and exterior surfaces of the finished concrete. It was not until the substructure of the Santa Fe's Brazos River bridge was built that suitable steel forms were devised for such work which met with government approval. Since that time these forms have been further improved to the point where they are reported to be extremely rigid, to hold their shape, and to be capable of reuse on isomorphic structures. Also, they are sufficiently strong and tight to withstand the vibrating of the concrete specified for this work, which was for a maximum of 3-in. aggregate and a stiff mix having a slump of only 2½ in. Even with these tight steel forms, it is reported that there is no more surface pitting than is normally found on structures using similar air-entrained concrete placed in wood forms.

Piling Driven by Air Hammer

Plans for the new railway bridge call for the two abutments and 20 of the 33 piers to be supported by H-section bearing piles, totaling 62,500 lin. ft. of 12-in. 53-lb. and 38,500 lin. ft. of 14-in. 73-lb. bearing piles. Piers No. 3 to No. 6, inclusive, are in the water and will be set on caissons sunk by the pneumatic method to chalk. Piers No. 2 and No. 25 to 33, inclusive, are to be set on chalk and keyed into this formation. Of these,



SOME OF THE PIERS were as much as 159 ft. in overall height. This view shows one of these piers with the upper form sections in place. The cable slings at the sides of the forms were used for placing the sections in position with the assistance of a crane which was equipped with a long boom to facilitate form handling

Sectional steel forms produced economies both in the cost of the formwork and in the placement of concrete when used for the construction of 33 piers for a new railway bridge to carry the main track of the Milwaukee Road over the Missouri river. The forms used, which meet the approval of the U.S. Corps of Engineers, are said to be very rigid.

Concrete Piers

Piers No. 2, No. 30, No. 31 and No. 32 have anchors that penetrate into the chalk to resist any ice action. The other piers are being placed on bearing piles from 55 ft. to 90 ft. in length, driven by a No. 1 Vulcan hammer which is operated from a 600-cu. ft. rotary-vane Ingersoll-Rand air compressor. The use of the air compressor, with its freedom from frozen lines and boiler difficulties, permitted pile driving to proceed during cold weather, and pile driving actually has been accomplished during temperatures of 10 deg. below zero.

The overall height of the piers, from the bottom of the footing to the bridge seat, ranges from 68 to 151 ft. The construction of pier shafts of the design specified for this job, i.e., having semi-circular ends and battered all the way up the shafts, would present considerable difficulty in the building of forms if wood were used for this purpose. It was therefore decided to use steel forms, fabricated of 3/16-in. metal with ribs around the circumference of the semi-circular end sections to give the forms sufficient rigidity to retain their shapes. Since the end-section forms were semi-circular in shape, the pressure from the weight of the fresh concrete was equal in all directions on these forms, making inside form ties unnecessary.

The straight parts of the form sections (between the end forms) were made of metal with 5-in. horizontal channels for studs and double 5-in. vertical channels for wales. Williams Super-Hi Tensile form clamps and ties were used so that three rows of 5/8-in. high-tensile steel ties were all the form ties that were required. The 5-in. horizontal channels furnished ample tensile strength for holding the opposite end sections together, and 5/8-in. bolts at 14-in. spacing were used for tying the end sections to the center panels.

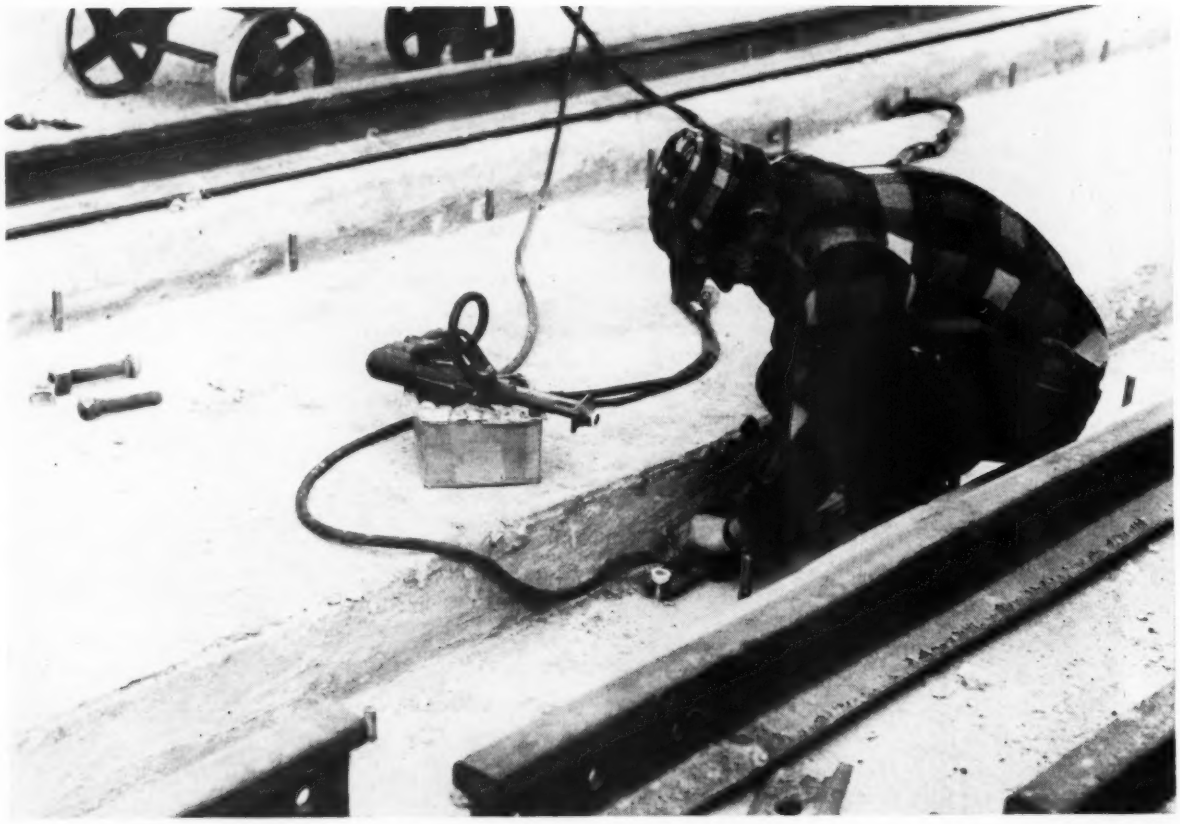
Poured in Two Lifts

Massive concrete footings were poured on the bearing piles and the pier shafts were each poured in two lifts. The reinforcing steel for each lift was assembled on the ground, then lifted into position by a crane, using slings to hold the cage of reinforcing steel in its proper shape.

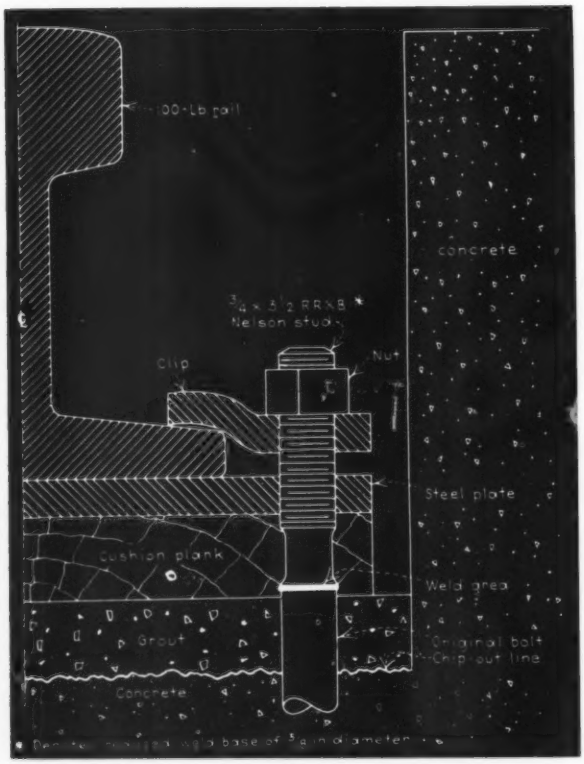
The forms were assembled in large sections and, being equipped with cable slings, were set into position by a crane having a long boom. When the first lift had been poured and had set sufficiently, the forms were dismantled by removing the she-bolts of the ties through the center panel, unbolting the end sections from the center panels, and moving the sections intact to the next pier location. Forms for the second lift were then placed. Using a perforated water hose, the curing of the concrete was begun immediately on all exposed concrete.

These patented steel forms are reported to have several advantages. They are rigid and hold their shape. By using a minimum of the high-tensile form ties and placing them just above the concrete as the pour progresses, it is possible to lower the concrete bucket inside the forms with no inside obstructions, and to place the concrete mixtures without the use of tremies. This placement procedure is not only economical, but also enables the inspector to spot the bucket as he wishes at any place inside the forms and materially assists in the elimination of honeycombs. Since these forms are used many times, the form-setting crews have become highly skilled at dismantling and re-erecting them.

The new railway bridge is being built by the U. S. Corps of Engineers under contract. The substructure is being built by the Guy H. James Construction Company, Oklahoma City, Okla., which also built the patented forms. The superstructure is being erected by the American Bridge Company, Chicago. The general layout and design for this structure were worked out jointly by the U. S. Corps of Engineers, Sverdrup & Parcel, Inc., consulting engineers, St. Louis, Mo., and B. J. Ornburn, assistant chief engineer structures of the Milwaukee Road, while detailed plans were prepared by the consulting engineers and approved by Mr. Ornburn.



LOCKING pliers, permanently attached to the gun ground cable, hold the lower ferrule in place. Saw teeth of the lower ferrule mesh with those of the gun-held upper ferrule to insure centering of the stud on the bolt during the welding operation



DETAIL showing the installation after completion of all work

Stud-Welding Simplifies

Savings of time, labor and material were effected by welding threaded stud extensions to existing anchor bolts for the rails. By this method, the use of new material was kept to a minimum and the maximum salvage of old material was realized.

• On a recent project involving the reconditioning of the pier facilities of the Earle U. S. Naval Ammunition Depot at Leonardo, N. J., the replacement of all of the existing railroad trackage on the piers was found to be necessary. The old light-section rail had worn to a point where continued safe operation was considered questionable, and it was decided to relay the trackage with 100-lb. rail. The old track was secured to the piers by long bolts, the heads of which were embedded in the concrete to a depth of 6 in. Investigation showed that many of the bolts were seriously corroded at their thread ends to the extent that they were no longer usable.

Since the task of chipping out and replacing the bolts would have entailed considerable expense, Navy civil

WITH THE TWO porcelain ferrules meshed and the gun vertical, one pull of the trigger permanently fuses the threaded stud to the bolt

THIS PORTABLE battery power source made possible the use of the stud welding process far from power lines

Rail-Relaying Job on Deck of Concrete Pier

engineers and the contractor, Charles F. Vachris, Inc., Brooklyn, N. Y., decided to employ the stud-welding method for reconditioning the bolts in order that they might be reused to secure the rails.

The rails were first removed and the existing grout in the rail troughs was removed with pneumatic chipping hammers. The bolts were then cut off a slight distance above the floor of the trough with an oxy-acetylene torch. Enough of each bolt was removed so that only sound metal remained. Threaded studs, ¾ in. in diameter by 3½ in. long, manufactured by the Nelson Stud Welding division of Gregory Industries, Inc., Lorain, Ohio, were then welded to the bolts with a semi-automatic Nelson stud-welding gun. In this manner the bolts were lengthened to the extent that they could accommodate the new rail.

In the welding operation, double porcelain ferrules were employed. These ferrules, which are provided with meshing saw teeth, are self-centering and provide maximum shielding of the welding arc. The lower ferrule was slipped on the protruding portion of the old bolt and held in place by a pair of locking pliers, to which the welding gun ground cable had been permanently attached. To prevent burning of the plier jaws, pieces of copper bus were inserted between them for protection. The granular flux-filled stud and the upper ferrule were placed in the gun, the gun was positioned over the bolt, the saw teeth of the ferrules were meshed, the trigger was pulled, and the operation was completed. Two welding guns and two battery power sources were used to apply the studs at the rate of approximately 500 per day. The battery power sources were employed due to the fact that commercial electric power was not conveniently available. Batteries were recharged following each day's operations.

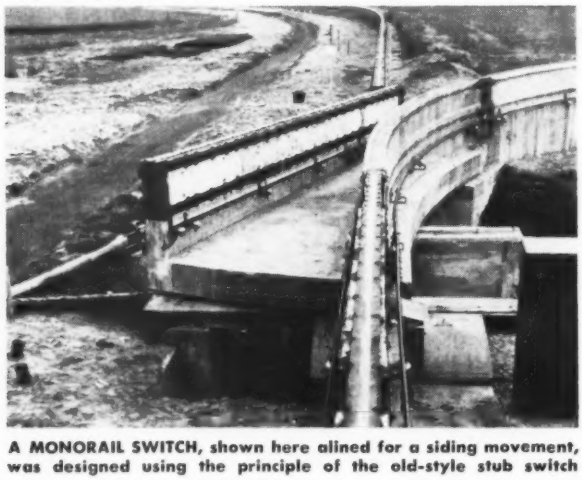
Rails Secured By Clips

After the studs had been installed, enough grout was placed in the troughs to bring the rails up to the desired height. Wood cushion planks were then placed on top of the grout. The rails, resting on steel plates atop the planks, were secured by clips anchored by nuts run down the threaded extensions of the original bolts. The troughs were then filled with grout after the rails had been secured.

Tests conducted by the Navy show that butt welds produced by this method can withstand a tensile load of 18,000 to 19,000 lb. before fracture. Using a standard track wrench with a 4-ft. pipe extension, workmen were able to strip the threads from the studs without failure at the weld area.

THE MONORAIL TRAIN, which is controlled from towers located along its route, runs on a concrete girder with a main rail on the top and metal guide plates on the sides. The unit shown here is a model, two-fifths actual size, built for test use

All photos by United Press



A MONORAIL SWITCH, shown here alined for a siding movement, was designed using the principle of the old-style stub switch

FINISHING TOUCHES are put on model monorail car. Bottom half of car houses the driving mechanism and luggage compartments

Railroad of the Future?

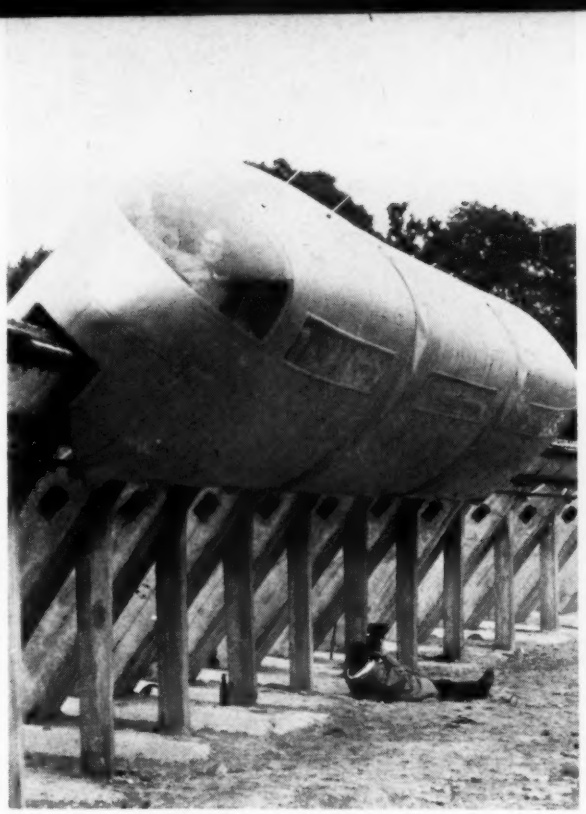
"Monorail" System

Speeds of 200 m.p.h. are said to be possible with a system based on an entirely different principle of support, traction and guidance or stabilization. Advantages claimed, in addition to high speed, include a high degree of safety and relatively low cost of operation.

• The development of a revolutionary system of high-speed, streamlined land transportation, which promises speeds far in excess of those now possible, was recently revealed in Germany. Although the system is still in the experimental stage, a working model two-fifths actual size is in successful operation, and it is claimed that the system will be introduced commercially within a year.

Runs On Five Rails

The monorail principle is used in the sense that the track consists of a single reinforced concrete girder, rectangular in cross section, which is supported at intervals on a single line of concrete piers. Actually, however, the girder carries five metal rails—one main rail for traction on the top and two guide rails, flat metal bands, on each side. The main drive wheels of the train operate on the top rail, while four sets of guide rails run on the metal bands fastened to the vertical faces of the girder. Power is supplied from insulated rails supported from the sides of the beam below the lower stabilizing rails.



CURVES on the model track are banked 45 deg. An average speed of 90 m.p.h. has been attained on the mile-long oval track

PASSENGERS enter the car from the top through hinged doors as shown here. Trains are controlled from tower in background

Unveiled in Germany

The vehicles designed for the new system are streamlined in appearance and are shaped with a longitudinal groove in the bottom so that they appear to "hug" the supporting girder. Ball-bearing wheels operate on the top rail of the girder, while stabilizing wheels bear against the side rails which extend along the top and bottom of the sides of the beam.

Uses the "Alweg" System

The idea embodied in the new system, known as the Alweg system, came from the Swedish industrialist, Dr. Axel L. Wenner-Gren. It was developed in Germany by a group of engineers organized as the Verkehrsbahn Studiengesellschaft (Transportation Research Company) the staff of which includes engineers formerly connected with the aircraft, automotive and railroad industries. The installation now being demonstrated is a two-fifths scale model and is set up at Fuehlinger Heide, near Cologne. The track, which is a reinforced beam about 10 in. wide, is in a mile-long oval banked to 45 deg. in the curves. On this line the model, consisting of three units, has attained an average speed of 90 m.p.h.

Expect Speeds of 200 M.P.H.

On full-scale installations on long-distance operation the trains are expected to attain speeds of close to 200 m.p.h. These installations will consist of supporting columns of reinforced concrete 16 ft. or more high and spaced from 40 to 50 ft. apart. The entire weight of the vehicles is available for traction, and power will be such that accelerations of 3 m.p.h. per second may be attained. The units are carried on trucks, one at each end. In the inner frame are mounted the supporting wheels, which are also the driving wheels. This inner frame is connected to an outer frame through springs and the latter, which carries the wheels that bear against the stabilizing rails on the sides of the track-supporting beam, is connected rigidly to the vehicle body. There are no flanges on the carrying wheels. To permit transfer to standard-gage two-rail tracks, for operation at reduced speed, the Alweg units are also fitted with conventional flanged wheels.

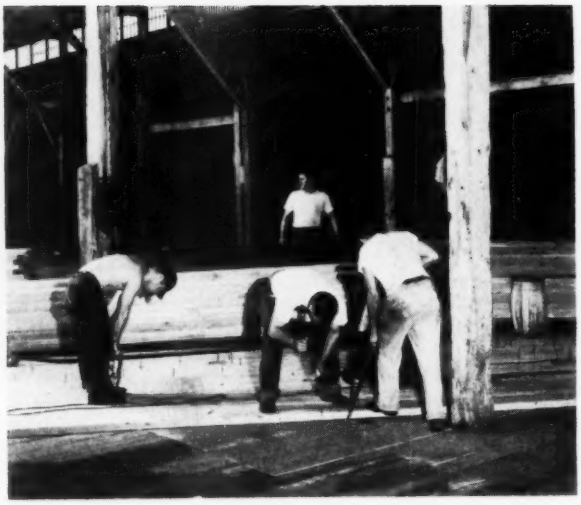
The trains are controlled from the roadside, rather than from a cab on the train. These roadside controls automatically regulate the differential speed of successive trains as a function of the distance between trains. This is expected to permit a much closer spacing of trains than is possible with the conventional block system.

These Advantages Claimed

Among the advantages which developers of the Alweg system believe it possesses are: (1) absence of flange wear; (2) all weight is adhesive weight; (3) the track structure imposes practically no limitations on speed; (4) there are no crossings at grade with other channels of surface transportation, either highway or rail, and (5) greater safety. Power requirements are expected to be much lower than those of surface transportation on two-rail tracks, partly because of the absence of ground effect in creating turbulence in the air under a moving train. Compared with the power required to move an ordinary passenger train with accommodations for 800 passengers at 100 m.p.h. with a power consumption of 4,000 hp., the Alweg is expected to be able to move the same number at the same speed with not more than 580 hp., and it would move them at 200 m.p.h. with 3,000 hp.

The company is said now to be undertaking work on the first full-scale version of the system.

NEW SUBFLOORING was applied, which consists of 3-in. planks, 8 in. and 10 in. wide. After application, subflooring was smoothed and leveled in preparation for edge-grain flooring



THE NEW FLOORING was applied diagonally with the planks in the subfloor. The pieces were handled in practically the same manner as for ordinary planks; no special tools were required

THIS VIEW, showing a portion of Pier A after new flooring had been placed, gives an idea of the scope of the project. About 90,000 sq. ft. of flooring was applied in this pier alone

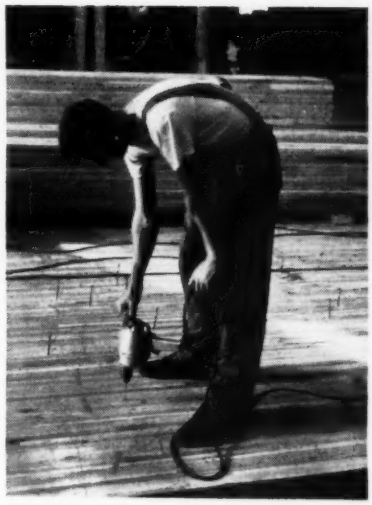
A HAND-HELD power saw was used to cut the pieces to length, but it was necessary to make the cuts square. Triangular spaces, abutting columns, walls and elsewhere, were filled with mastic

THIS VIEW, taken in the laboratory of Timber Engineering Company, shows bundles of the edge-grain planking and solid oak controls preparatory to pressure treatment with creosote and other preservatives. Note tongue-and-groove construction of edge-grain flooring. Metal drive dowels hold pieces together

What It Is; How It's Made

The edge-grain laminated flooring being installed in two tidewater piers of the Reading is a recent development of the Graham Tie Dowel Service Company, Columbus Ohio, which is owned jointly by D. B. Frampton & Co., Columbus, and the Pittsburgh Screw & Bolt Corp., Pittsburgh. This type of planking consists of relatively short lengths of tongued-and-grooved hardwood strips, fastened together by means of metal spiral drive dowels spaced at intervals of about 15 in. along the neutral axis of the plank. Since the joints of the component strips are staggered, the planking can be manufactured to any length and is made in various widths up to 12 in.

The first step in the manufacturing process is to rip hardwood boards into strips, the width of which determines the thickness of the finished product. Strength-reducing defects are cut out of the strips which are then run through a moulding machine which cuts a tongue on one face of the strip and a groove in the other. The finished strips, of varying lengths above 18 in., are turned on edge and continuously fed in to a special "sewing" machine in a ribbon comprised of 6 or more strips in width. This machine



THE FLOORING was fastened to the subfloor with 5-in. screw spikes. This view shows the holes for the spikes being bored with the assistance of a portable electric drill

AN ELECTRIC TOOL was also used to countersink the holes for the screw spikes. Some of the planks were drilled and countersunk before being laid on the subflooring

DRIVING the spikes with a pneumatic hammer. The use of power tools on this project was an important factor in expediting the work and reducing the cost

Uses New-Type Wood Flooring in Renovating Old Tidewater Piers

Two frame structures on Reading at Philadelphia are being extensively rehabilitated to promote efficiency in handling cargo to and from ocean-going vessels. Work includes, in addition to renewal of the flooring, the installation of roof hatchways, crossover bridges spanning depressed tracks, and fire-preventive measures.

• Edge-grain laminated oak flooring (see description given below at left), is figuring prominently in the rehabilitation of two large frame tidewater piers owned by the Reading. These are known as Piers A and C and are located on the Delaware river at Port Richmond (Philadelphia). In addition to the new flooring the piers are being modernized in other respects including the installation of roof hatches along one side of each structure to facilitate the handling of cargo to and from vessels, and the provision of movable crossover bridges to span two depressed tracks extending along the center of each pier.

bores the holes and inserts the dowels. The edge-grain plank comes out of the machine in a continuous piece that is then cut to specified lengths.

Engineering data developed on the edge-grain planking by the Timber Engineering Company has led to the recommendation of tentative allowable unit stresses for extreme fiber in bending between 2,300 and 3,000 psi, with a modulus of elasticity value of 1,200,000 psi. Dimensional stability tests on edge-grain planking and solid flat-sawn oak controls included a high and low humidity conditioning treatment and accelerated weathering tests. Swelling and strength measurements during the conditioning treatment were said to indicate that, in expansion across the grain, the dimensional change for doweled planking was approximately ½ the expansion of solid oak. The shrinkage during drying was said to be only 10 per cent of the shrinkage encountered with solid planking.

Even though a considerable amount of the new flooring has been produced to date for use in the Reading piers and other installations it is expected that it will be the middle of 1953 before increased production facilities, now under construction, will provide for sufficient capacity to meet present orders and the expected demand.

Description of Piers

The two piers are similar in construction. They are both covered piers with roof structures consisting of timber trusses supported by timber columns. The sidewalls were fitted with wood sliding doors, and for handling merchandise in and out of the doors, cargo masts were mounted on the roofs along both sides of each structure. Two depressed tracks extend the length of each pier, and in addition there is an apron track along the south side of Pier A.

The substructure of Pier A consists of filled timber cribs supporting frame bents for carrying the floor joists. In Pier C the floor is supported on timber-pile bents. The original flooring in each structure consisted of 3-in. timber planking, with 2-in. planking being superimposed over this to provide driveways for street trucks along both sides of the depressed tracks.

Pier A is about 890 ft. long on the south side and 684 ft. long on the north side, the difference in length being accounted for by the fact that there is an L-shaped ex-

Three of the eight hatchways along the north side of Pier A. The doors in these openings are slanted at an angle of 30 deg. with the vertical, giving a horizontal area 8 ft. by 15 ft.

tension on the north side of the pier at the inshore end. The enclosed portion of this pier is 159 ft. wide. Pier C, which has a width of 150 ft., is 647 ft. long on the south side and 620 ft. long on the north side. At the inshore end there are extensions in both directions so that the floor plan is roughly in the shape of a capital T.

Modernization work on Pier A was undertaken first and has now been completed. Work on Pier C is now underway, and is scheduled for completion early in December. Although the following description of the rehabilitation work applies primarily to Pier A, the character of the work being done on Pier C is essentially the same.

Flooring Largest Item

The largest single element of the work was the application of the edge-grain laminated flooring of which approximately 90,000 sq. ft. was applied in Pier A. In this work the old flooring was removed and the frame bents and joists were renewed as necessary. A subfloor of 3-in. planks, 8 in. and 10 in. wide, was then placed. This flooring, as well as all new members in the substructure, are of untreated yellow pine except the sills and posts which are of creosoted material.

After the subflooring had been smoothed and leveled by adzing, the edge-grain laminated flooring was placed diagonally over it. The laminated flooring as applied on this job was in the form of pieces 12 in. wide and 2 in. thick, which came in lengths of 16 ft., 18 ft. and 20 ft. It was fastened to the subflooring by 5-in. screw spikes. Holes for the spikes were bored and countersunk with electric tools. A pneumatic hammer was used to drive the spikes, and where the plank had to be cut to length this was done by power hand saws.

Because of the laminated nature of the new flooring, and the presence of the metal dowels, it was not practicable to cut the ends of pieces at an angle where they abut along the walls, at the edges of the deck along the tracks, or at the roof columns. This problem was solved satisfactorily, however, by leaving the ends square and by filling in the triangular spaces with a mastic flooring material. Since freight handlers sometimes have the habit of nailing trucking aprons to the dock floor, heavy oak planks were placed along the edges of the floor on the track side to serve as nailing strips for this purpose, and the edge-grain flooring was abutted against this strip. In this way any damage resulting from the repeated nailing of trucking aprons is confined to the strip which can be readily renewed.

Installing the Hatchways

The modernization work done on Pier A included the installation of eight hatchways in the roof along the north side of the structure. The purpose of the hatchways is to facilitate the loading and unloading of vessels by permitting cargo to be hoisted and lowered directly from and to the dock floor using ships' tackle. Formerly, as stated at the outset, this function was performed by the cargo masts located on the roof of the dock. With these masts it was necessary to swing the loads through the doors in the vertical walls of the dock. This was a relatively slow and awkward procedure.

The new hatchways were formed in a novel manner involving placing doors on an angle of 30 deg. from the vertical. With this arrangement, the required horizontal areas of about 15 ft. by 18 ft. are made available when the doors are in the open position. These hatchways are framed with steel and are fitted with Wilson steel rolling doors. Eight hatchways of this type are also being installed along the north side of Pier C.

Another important improvement in Pier A (as well as Pier C) was the installation of three steel crossover bridges spanning the depressed tracks, replacing former wooden construction. Each of these new structures is a double-leaf bascule-type lift bridge, with both leaves hinged at the column line between the tracks. The bridges are 16 ft. wide and have decks of open-type grating welded to a framework of wide-flange beams and channels. Each leaf is lifted by two cables attached to the movable end and extending through an overhead system of sheaves to hand-operated winches mounted on columns between the tracks. Each cable is operated by a separate winch. The width and design loading (H-20 of the American Association of State Highway Officials) are such that two fully-loaded fork-lift trucks may pass each other on one of the bridges without overstressing it. These bridges were designed and built by company forces. Three such bridges are also being installed in Pier C.

At the inshore end of Pier A the L-shaped extension on the north side was cut back on the street side to provide a driveway and a tailboard area for the loading and unloading of trucks. The openings at the tailboard space are enclosed by six Wilson 16-ft. manually operated overhead doors of the same type as used in the hatchways. Other work done in the L-shaped extension included the construction of office space for the Waterman Steamship Company which will be a large user of the rehabilitated piers.

Other work done in Pier A included the provision of transverse corrugated metal fire curtains at intervals under the roof, and the construction of fire-walls of oak under the dock floor. Similar fire-protective features will be installed in Pier C. Modern lighting is being provided in both piers, the interiors are being whitewashed and the exteriors painted.

The work described in this article is being carried out under the general supervision of E. L. Gosnell, chief engineer of the Reading. Structural changes in the superstructure of the piers, including the installation of the hatchways and the overhead doors, are being made under contract by the Hauser Construction Company, Philadelphia. The J. E. Brenneman Company, Philadelphia, has the contract for installing the new flooring and crossover bridges and for making necessary renewals in the substructures.

Reasons for Failure Prove
Guide to Solution of Crosstie Problem

For several years the Santa Fe has had a chief inspector and four tie inspectors working continuously on a program to determine the types of failure requiring that ties be removed from track. The results of the program to date, which has involved the examination of 404,010 ties, are given in this article, which is based on an address delivered by Mr. Blair before the recent annual meeting of the Railway Tie Association.

By T. A. Blair
Chief Engineer
Atchison, Topeka & Santa Fe System

• Late in 1949, the Santa Fe decided that its experienced tie inspectors who had previously spent most of their time checking test sections could best serve the company by spending their time with tie-renewal gangs determining the types of failure causing renewal. A program to put this decision into effect was initiated in 1950, and I am now reporting results for the two-year period, 1950 and 1951. One chief inspector and four tie inspectors have worked continuously on the program. Constant checks are made to make certain that all inspectors work with as nearly uniform judgment as is humanly possible.

Eight Types of Failure

For the purpose of the program the types of failure were classified as follows: Decay, plate cutting, split, shatter, spike kill, broken, ring separation, and accident. Very few ties fail from one cause alone, and the main problem for the inspector is to determine the primary cause of failure.

In 1950, a total of 148,729 ties was inspected after removal from track, or 12 per cent of our total renewals. In 1951 the ties inspected totaled 255,281, or 21 per cent of the total renewals. The 404,010 ties inspected in the two-year period amount to a 16 per cent scatter sampling of our total tie renewals.

A record was made for each tie showing, in addition to cause of failure, the year of insertion in track, type of wood, kind of treatment, and whether sawn or hewn. The major woods used in ties by the Santa Fe are southern pine, western pine, red oak, gum and Douglas fir. With the exception of the World War I period when zinc chloride was used, the treatment was straight creosote until 1923, and since that time the standard preservative has been a creosote-petroleum mixture. The number of ties inspected and the percentage of the total for each type of failure are given in Table I. Data on the average ages of the ties removed for the various causes are given in Table II.

Little Decay

For all woods only 5 per cent were removed because of decay—95 per cent because of mechanical wear. It is interesting to note that more ties are removed as a result of train derailment than because of decay.

Of the southern yellow pine ties removed, 98 per cent failed because of mechanical wear. Plate cutting alone caused the removal of 38 per cent of these ties. The A.A.R. test section on the Louisville & Nashville will finally point the way to the solution of this problem through improved tie-plate fastenings or tie pads. Because of the fact that ties removed due to plate cutting have an average service life of only 22.1 years, the Santa Fe is at the present time concentrating on the most economical solution, namely, Racor Studs and plastic compounds placed between the tie plates and the ties.

From Table I it will be noted that 17 per cent of the southern pine ties are removed because of splitting. It has been observed that about this

Table I—Number of Ties Inspected of Each Specie and the Percentage Removed for Each Type of Failure

Wood	Number of Ties	Decay	Plate cut	Split	Shatter	Spike kill	Broken	Ring separation	Accident	Total
Southern Yellow Pine	288,171	2	38	17	34	0	0	3	6	100
Western Pine	27,245	4	23	35	24	0	6	0	8	100
Oak	23,565	14	4	67	8	1	1	0	5	100
Gum	31,362	29	5	53	3	1	1	0	8	100
Douglas Fir	28,649	0	47	26	25	0	0	0	2	100
All Woods	404,010*	5	33	24	29	0	1	2	6	100

* The actual total of the ties removed of the five types listed is 398,992. The difference of 5,018 is accounted for by ties removed of non-standard species and non-standard treatments.

TABLE II—Average Age in Years of the Ties Removed for the Different Types of Failure

Wood	Decay	Plate cut	Split	Shatter	Spike kill	Broken	Ring separation	Accident	Total	Age of Oldest Tie
Southern Yellow Pine	23.7	22.1	25.1	24.3	21.5	21.3	15.8	18.5	23.0	49
Western Pine	28.1	26.2	29.3	31.2	24.7	22.3	22.5	21.8	28.0	45
Oak	27.2	24.1	22.7	25.7	28.1	24.5	21.5	18.6	23.5	45
Gum	26.1	25.0	25.6	27.8	27.7	24.9	20.8	20.2	25.3	46
Douglas Fir	21.9	21.6	21.4	21.8	27.0	20.4	13.0	21.6	21.6	42
All Woods	26.3	22.4	24.9	24.7	24.1	22.6	16.0	19.1	23.6	

percentage of air seasoned ties show a split pattern through the tie length, and for this reason we are experimentally dowling these particular ties.

Shatter causes the removal of about 34 per cent of the yellow pine ties. Information given in inspectors' reports indicate that a high percentage of the ties failing because of shatter were treated in particular years. A study of the treatment for these years reflected in some instances that a combination of relatively high temperatures, pressure, and long pressure periods might have been responsible for some of this condition. As a consequence, necessary adjustments have been made in the treating cycle. Also, in one year we gave our ties a rapid and early treatment that we think has resulted in early failure.

The record shows that 4 per cent of the western pine ties were removed because of rot and 6 per cent due to breaking, the latter being six times as high as for any other wood. Plate cutting and shatter for western pine is about two-thirds that of southern pine, but splitting is twice as bad. The remedies for mechanical wear in ties made of this wood will be the same as for southern pine ties.

In view of the fact that 14 per cent of the oak ties were removed because of decay, experiments have been conducted and completed with a special pattern of incising teeth, which show that depth of penetration of treatment can be increased in those oak ties which are known not to accept enough mixture. Only 4 per cent of the oak ties were removed because of plate cutting. However, the removal of 67 per cent of such ties because of splitting indicates a condition that requires correction. The ties removed had no "S" irons or other types of end anti-splitting devices. In recent years about 15 per cent of these ties have been doweled, and this year the doweling is being increased to about 35 per cent. A recent study indicates that Vapor Drying, with 12 per cent doweling, offers the best prospect as a solution to the splitting of oak ties. We expect to equip one cylinder for Vapor Drying oak ties in 1953. Test ties in our track show that Vapor Drying increases penetration, so it should reduce decay as well as splitting.

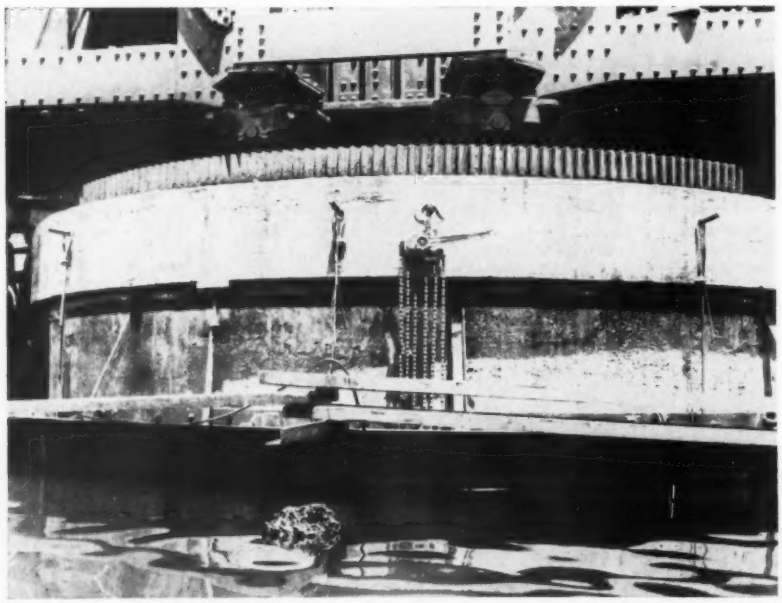
Most of the rot causing the removal of 29 per cent of gum ties is due to lack of penetration of the heartwood. We are equipping an incising machine with a special roll giving incisions close enough together to permit continous perimeter penetration of heartwood, and expect this materially to reduce decay in these ties. Plate cutting in gum ties (5 per cent) is not a major problem. However, the removal of 53 per cent of these ties because of splitting constitutes a problem that is being met by increasing the amount of doweling.

None of the Douglas fir ties was removed because of decay. The problem of plate cutting in these ties (47 per cent) is being attacked as in the case of pine ties. Since 26 per cent of these ties failed by splitting, we are doweling those ties showing a split pattern. We expect a betterment in the shatter problem for the same reasons as for pine ties.

We think we are getting our problems defined. The factual data point to the solution of some of the problems, while others can be solved only by experimentation. The result will be increased tie life. We are convinced that we can use each of the five types of wood for ties on different parts of our system, as dictated by economics, giving consideration to the total cost of the tie in place.

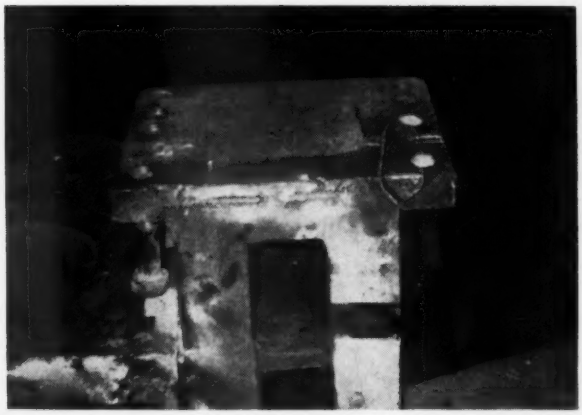
Records Invaluable

Our record of the average age of ties removed, by types of wood and causes of failure, has been invaluable to us in setting up a program for extending tie life. Incidentally the tabulation of these ages does not represent the average tie life we are getting in track, mainly for the reason that our sampling of ties removed has been entirely in connection with extra gang renewal of ties ahead of surfacing gangs. Next year we hope to include a sampling of ties removed by section gangs. We feel that we have no deferment in tie renewals. Our records show that, for the past five-year period, our main-line, main-track renewals have averaged 100 per mile, indicating an average life of better than 30 years.



DISINTEGRATION of the concrete in this large, 26-ft. diameter pier, supporting the Bear Creek swing bridge of the Baltimore & Ohio at Baltimore, Md., presented a complicated repair problem. To lengthen the service life of the installation, a method of protection was developed by the road's engineers, which provided that the pier be encircled with 3/16-in. wrought iron plate, 7 ft. high and extending approximately 1 ft. above the water line. When the pier was sealed at the bottom and made water tight, with the help of 3/8-in. wrought iron angles, the disintegrated material was removed and the 16-in. space allowance between the plate and the pier filled with new concrete. The corrosion resistant mold of wrought iron plate was left in place to provide an added measure of protection. The Masonry Resurfacing & Construction Co. of Baltimore was the contracting firm. The wrought iron plates were fabricated in the B&O shops located at Martinsburg, W. Va.

THE INITIAL WELD was composed of a series of beads placed by the skip welding method. These beads were then peened and wire brushed to form a foundation for the finishing weld metal



WHEN COMPLETED, it was discovered that the weld metal provided such a close color match to the iron of the casting that close examination was necessary to determine the welded area

NORMALLY in a horizontal position, the rolls were turned on end during the moving operation within the shop. The arrow denotes the broken portion of the base flange of the casting

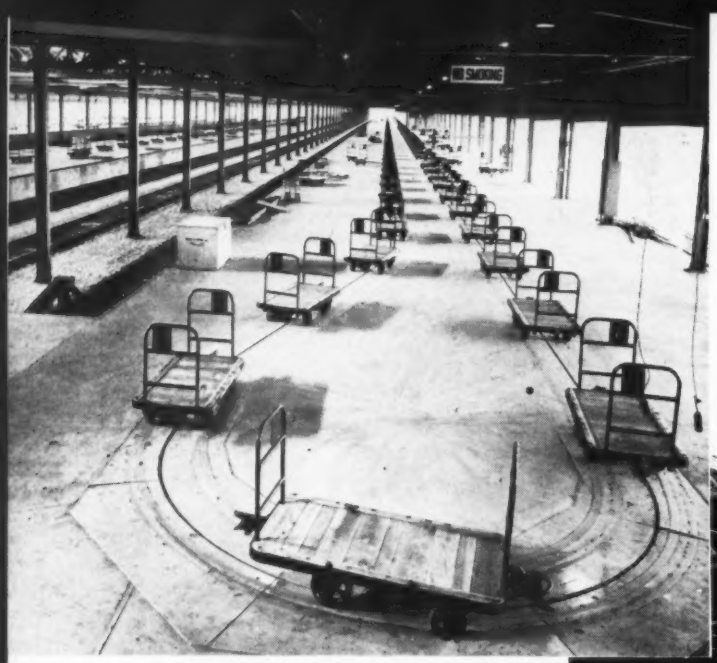
Large Casting Repaired by Welding

• As a set of rolls, used for the rolling of heavy boiler plate, was being moved to a new location in a railroad maintenance shop, a corner of one base flange was broken away from the main casting. As this piece struck the concrete floor it was broken into two parts by the impact. The cost of replacement, requiring a new casting and pattern, would have been considerable and the loss of production time serious—so it was decided to repair the break by welding. It was realized, however, in view of the great weight exerted on the base flanges (the entire assembly weighs 119 tons), that considerable care would have to be taken to insure adequate strength in the welded regions.

Skip Welding Method

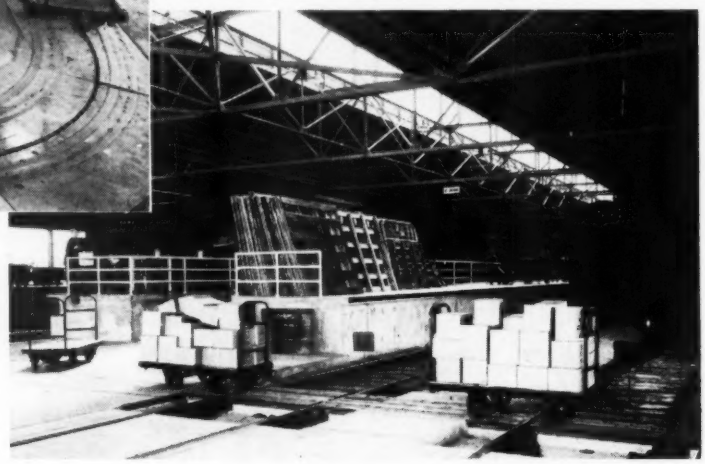
The problem of preheating a casting of such size, so necessary with conventional welding methods, was circumvented through the use of two specially formulated electrodes manufactured by the Eutectic Welding Alloys Corporation, Flushing, N. Y. The facing edges of the pieces to be joined were beveled to form a 90-deg. vee, and the arc-welding machine was set to 120 amp. direct-current, reversed polarity. A fast-flowing electrode, the 5/32-in. EutecTrode 660, said to be specially practical for welding oil-impregnated cast iron, was used for the initial deposits and spatter-free beads were deposited as a foundation for the weld metal that was to follow. A medium arc was used to run stringer beads by the skip-welding technique, a method by which beads are applied as far from each other as practical to prevent excessive local build-up of heat. The beads were then peened lightly to remove residual stresses and slag was removed by wire brushing. Finishing welds were made with EutecTrode 24X, a high-strength, fully machinable electrode, possessing a tensile strength of 50,000 psi. The amperage was then changed to 130 amp., reversed polarity, and 3/16-in. electrode used with a similar application technique. The low heat required, combined with the skip-welding method, made it possible to hold the casting to a comfortable hand heat at all times.

When the welds had been completed it was found that the electrode used to make the finishing welds had provided such a close color match to the cast iron, that close scrutiny was necessary to determine the welded area after machining. The entire assembly was restored to service in less than 12 hr., and has been in continuous operation since without mishap. The repaired base flange is reported to show no signs of failure. It is obvious that the low cost of welding this flange was but a fraction of the replacement cost plus the loss of production time.

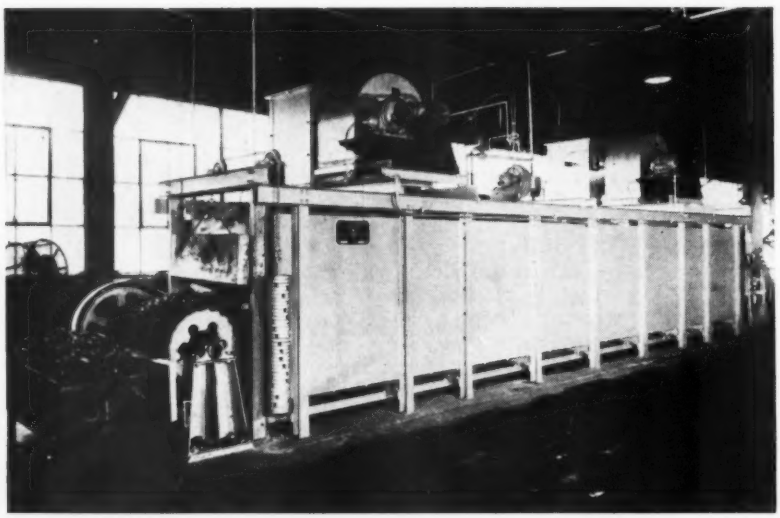


▲ **"GIVE US PLENTY OF ROOM"** is the cry of all freighthouse foremen, so that is just what the Santa Fe engineers did when they designed this new freight station located at the road's Corwith yard in Chicago. There are no columns on the platforms except for one line along the outer edge of each of the two outer platforms. A Towveyor system, the first to be installed in any railroad freighthouse, presents no overhead obstruction and consists of an underfloor chain with catch devices, spaced about 15 ft. apart, reached through a slot in the platform.

▼ **THE TOWVEYOR** system is in two circuits: one serves the inbound platform only and the other serves both the center and the outbound platforms. At the north end of the station, the Towveyor goes down a ramp of the center platform, turns left to cross three house tracks at grade, then travels up another ramp on a 6-deg. grade to the outbound platform level. This system does not require any moveable crossover bridges. Platform trucks are easily put on and taken off the line by operating a device known as the "Santa Fe pin," which is raised and lowered by means of a foot pedal. When lowered, the pin slides along the platform while the truck is being pushed to the Towveyor track, then it drops into the slot where it engages a towing dog on the chain.



News Briefs in Pictures . . .

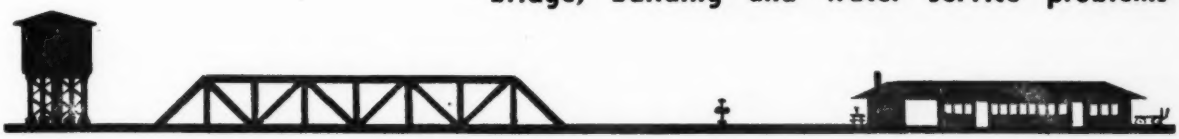


▲ **DUAL SANDERS** are used on each side of this Link-Belt Speeder Model HC-70 truck crane operated by the Boston & Maine. The sanding units are permanently attached to the truck and rigged so that one pipe is in front of each of the dual driving wheels on each side of the truck. In this manner, when the unit is operated on icy roads, little or no slippage is encountered while the truck is in motion.

◀ **THIS CONVECTION HEATED** draw furnace has recently been installed at the Chicago Heights, Ill., plant of the Mid-West Forging and Manufacturing Co. The furnace, which is 40 ft. long, is capable of drawing 600 3-lb. Improved Gautier rail anchors per hour, thus cutting the normal drawing time approximately in half. Anchors move automatically through two heating zones on a stainless steel belt. Operating temperature of the furnace is 995 deg. F. with 5-deg. tolerance.

WHAT'S THE ANSWER?

An open forum for maintenance men on track, bridge, building and water service problems



How to Eliminate Ice in Water Tanks

What economical methods are available to prevent the freezing of water in elevated tanks, especially where the consumption is small? Explain.

Must Use Automatic Control

By GEORGE CLARK
Engineer of Water Service,
Canadian National,
Winnipeg, Manitoba, Canada

As soon as the term "economical" enters the question we have to consider a method which will eliminate labor in connection therewith, as it is the only element over which any control can be exercised since a fuel or source of heat release cannot be eliminated. The problem takes on different aspects according to the tank structure and its location as well as the factor of "small consumption."

"Prevention of freezing" is also a much better term to use in this regard than "tank heating" as a tremendous amount of B.t.u.'s can be poured into a water tank of 40,000 to 100,000-gal. capacity to no good purpose.

As in so many practices established on railroads at a time when labor was relatively cheap and available seven days a week, tank heating has heretofore been done by the means most readily at hand. That is when the practice of using hand-fired coal burning heaters became established. Temperature was not under control with the result that wide variations took places, occasionally dropping to the freezing point, and allowing piping near the floor level to freeze up.

The advent of the 40-hr. week has introduced the problem of assuring adequate attention to keeping the tank fires burning over the longer week-end. In most instances on the Western region of the Canadian National, we have found that adequate frost prevention can be accomplished with the minimum attention of the maintenance forces by means of oil-burning space heaters rated at 51,000 B.t.u. fitted with the type of constant-level float chamber which can be operated by a direct-acting non-electric thermostat applied to the top of the float chamber and adjusted to a low setting of about 30 deg. This low setting has given satisfactory results as the position of the thermostat is quite close to the floor level and the induced draft from the circulating type of heater causes the coolest air to gravitate to that point and the temperature above that is much higher than freezing.

The ordinary service oil tank is discarded and the float chamber is connected to a standard household oil-service tank of 250-gal. capacity, thus requiring only periodic attention.

A steady controlled heat output at the minimum safe temperature to prevent freezing insures that the minimum amount of fuel is used and in strict accordance with the varying demand imposed by changing weather conditions. These applications are for the usual type of wooden-tank structures which are within a housing shell and not directly exposed to the outside atmosphere. It is obvious that an insulated shell would require very much less fuel than one which is not so treated. Furthermore, it will pay to close up any unnecessary window openings or other means which allow the escape of heat.

In the case of exposed steel tanks, there is no economical way to keep all the water liquid as the

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Answers to the following questions are solicited from readers. They should be addressed to the What's the Answer editor, *Railway Engineering and Maintenance*, 79 W. Monroe St., Chicago 3, and reach him at least 30 days in advance of the issue in which they are to appear. An honorarium will be given for each published answer on the basis of its substance and length. Answers will appear with or without the name and title of the cuthor, as may be requested. The editor will also welcome any questions which you may wish to have discussed.

To Be Answered In the March Issue

1. Why should tractors be "broken-in" when put in service? What should the breaking-in process include? How should it be carried out?

2. How can fumes from diesel locomotives being shopped in old, conventional-type steam-locomotive enginehouses best be removed with minimum loss of building heat? Explain.

3. To what extent are short rails necessary where insulated joints are installed in stretches of continuous welded rail? What length rails are preferable? Why? In what pattern should they be laid? Explain.

4. What are the advantages and disadvantages of zinc chromate paint as a priming coat on steel? Explain.

5. What are the relative advantages and disadvantages of pole driving and grouting for stabilizing roadbed? Is one more suitable under certain conditions than the other? Explain.

6. Under what circumstances, if any, is it desirable to test fuel-oil storage tanks before they are put in service? What methods can be used for making such tests? What are the advantages and disadvantages of each? Explain.

formation of ice on the inside of the steel shell is nature's own way of forming an insulator to reduce the heat loss from the central liquid core of the tank volume. If the volume of water used and the latent heat from the influent is inadequate to make up the heat loss through the shell, including natural ice insulation, then the proportion of ice volume to water volume is increased to the point where possibly inadequate service volume results.

Automatic pumping helps a great deal in these circumstances as the immediate replacement of the fresh supply of water prevents delay of traffic which might take place with the reduced capacity. We have found that where conditions are suitable, such as having a steel tank and automatic electric-driven pumping units, it is relatively economical to allow the pump to run continuously wasting the excess pumpage through the tank overflow. This action will keep the ice formation at the minimum by making use of the latent heat of the water. One must have a plentiful supply, freely available, to consider wasting water in this way. The pumping capacity should also be as small as can be conveniently used to meet the traffic demands.

Special conditions will require special consideration and each case must be treated on its merits. In any event, the method should include some system of automatic control to prevent waste of both fuel and labor.

Railroad Use of Electronic Scales

Is an electronic scale practicable for railway use? How does it operate? How do its facilities and methods of operation differ from those now in use? Explain.*

Holds Great Promise

By J. N. Todd
Superintendent,
Scales & Work Equipment, Southern

The answer to the first part of the question is that the electronic scale is not yet practicable for general railroad use, but is practicable for certain cases where the performance can be observed by a scale man at frequent intervals. It is quite practicable to obtain weights by means of electronic weight cells because it has been done for more than 10 years and the results are within very close limits of accuracy. The weighing of cars at rest on a track scale equipped with electronic weight cells has been demonstrated to the satisfaction of reputable scale men and may be considered an accomplished fact. The application of this principle to the recording of weights of cars in motion is still new but holds promise of sensational performance in speed and accuracy.

The so-called electronic weighing is based on the use of cells containing strain gages and makes use of the principle expressed in Hook's law of physics, that stress is proportional to strain within the elastic limit. The load applied to a cell therefore causes deformation which, when properly amplified, may be indicated in pounds. Weight cells placed under a weigh bridge and loaded with a freight car will indicate the weight of the car. The indication may be by visual dial or by a printing device, or by both. With proper controls a car can be weighed accurately in motion, the ticket being printed only when a car is alone upon the scale and upon the scale long enough for the function of the printer to be completed. If another car encroaches, or if the car being weighed leaves the scale before the ticket is printed, printing does not occur. To provide these protections is the purpose of the controls and because of the complicated nature of the process, it is easy for the functions to be disrupted. There are only a few applications of electronic weighing to moving cars and they have been in use for a short time only. For this reason the users are not yet prepared to comment on them freely.

The principal difference between the electronic and the conventional scale from a physical standpoint is that much less material is required in those cases for which the electronic principle is suited. The principal difference from a weighing standpoint is the greater speed at which accurate weights can be obtained. This latter consideration makes the method especially suited to the new high-speed switching demanded by management today.

Appear to Have Advantages

By Assistant Engineer

Several electronic scales have recently been installed for weighing coal cars in motion and the experience gained through their operation will point to their practicability for railroad use. As an experiment one railroad remodeled a modern plate-fulcrum scale to incorporate the electronic equipment so that the weighing efficiency could be simultaneously compared to the conventional beam weighing. This was done in cooperation with the manufacturer of the electronic equipment. The experience gained has led to the installations mentioned.

The principle of electronic weighing consists of measuring the deformation of a steel column by means of electric strain gages permanently attached to the columns. In the case of a present typical railroad track scale about eight such columns are used. They are about 4 in. in diameter and 8 in. long. Two are placed at each corner of the scale bridge. The wiring from the electric strain gages on each cell is led to a device in the scale house which totalizes all the strain effects and translates the results to pounds. The weight is shown on a visual conventional dial indicator and registers on a printing machine. The recorder moves through its entire range within several seconds.

The track-scale recorder with which the writer is familiar read to the closest 100 lb., but weighing installations in stock yards read to smaller movements, and portable kits used for weighing aircraft have movements to 10 lb. on the dials and can be interpolated to 3 lb. The cell capacity in an advertised aircraft kit was 50,000 lb. The electronic weighing device was developed during the war in answer to the need for a lightweight portable medium to weigh planes at any location in the field.

Some of the advantages of electronic scales as compared to present installations include: (1) Lower installation costs; (2) no dead rails needed on scale because the cells

* A feature article based on a comprehensive answer received to this question will be presented in a subsequent issue. This article will describe electronic scales and their railway operations.

are unaffected by movement of locomotives over the rails; (3) fast weighing; (4) push-button "zeroing" when necessary; and (5) any failure in device is instantly apparent. The main reason for lower installation costs is that cells can be placed under shallow beams carrying the weighing rails and thereby eliminate deep girders with their expensive end bearings and foundations. Scale pits can be more shallow and expensive drains or pumping facilities for handling seepage or leakage are unnecessary. The electronic cells are anodized and the conductor cables are waterproofed so dry pits are not essential.

In one coal company installation the cells are above ground, the reactions from the weigh rail being carried to a carrying beam which projects beyond the sides of the track. Hangers are placed over the cells and support the beams.

Weighing in motion of about eight cars a minute appears practicable. By the use of an "electric eye" at the approach to the scale, the weighing operation of any one car can be blocked out should the following car approach the live rail before the weighing and recording of the car is completed. By the same means, on the departure end of a scale, a car which is traveling faster than a predetermined speed can also be blocked out to avoid an error in weighing. Similar equipment is in use on present scales using automatic-weight recording attachments on the scale beam.

During the weighing of cars, "zeroing" of the mechanism may be required because of various conditions. This is done by a push button which restores the dial to zero. This is much quicker than the manual balancing of the scale beam which must be done frequently in present scales. If any of the mechanisms in an electronic scale becomes defective, the weighing device ceases to work. When that happens, fuses, relays and electronic tubes are easily and quickly replaced, but an experienced repairman is required to test the equipment and do the necessary maintenance work.

The date, time of weighing, symbol of scale, weight, and weightmaster can be registered on a card or on a prepared waybill. The light weight of cars must be read by an attendant. It can be entered into the machine for printing or placed on record forms independently. Electronic equipment occupies a small space and can be placed in any building near the scales. Its location is limited only to ability of the weighmaster to see the car numbers and light weight.

Other than the registering equipment there are no moving parts to wear as there are in the pivots and bearing blocks in old-style scales. In constructing scale pits, the extreme care required to provide non-yielding bearings for plate-fulcrum scales, and the careful alinement of the thin steel flexing plates used in place of the knife edges, is not required. However, in an electronic scale the weigh bridge must be restrained so that no end motion is permitted.

Resistance of Special Rails to Shelling

How do alloy and heat-treated rails compare with standard carbon-steel rails in resistance to shelling and detail fracture? Under what conditions of service, if any, is the use of such special rails warranted? Explain.

Results of Tests Good

By R. E. Cramer

Research Professor in Charge of Rails Investigation, University of Illinois, Urbana, Ill.

During the past several years a considerable number of rolling-load tests have been made in our laboratory to compare heat-treated and alloy rails with standard carbon-steel rails in regard to their resistance to the development of shelling. A rolling-load machine is used which supports a 15-in. section of the rail in a cradle which slowly rocks the rail from flat under the wheel to a position of 1 to 5 cant under the wheel. This type of test, using a 50,000-lb. wheel load, produces failures of the shelling type in standard carbon-steel rails in an average of one million cycles. When heat-treated rails or manganese-chrome-vanadium alloy rails are used in the test, it takes 4 to 9 million cycles to produce shelling cracks.

It should be pointed out that the laboratory tests do not have present all the conditions of service such as corrosion, side thrust and bending. However, we have predicted that such heat-treated or alloy rails certainly should last two to three times as long in service under conditions which produce early shelling failures. It seems to the writer that there must be certain locations on most railroads where it would pay to use the more expensive alloy or heat-treated rails in order to avoid the labor expense of relaying standard carbon-steel rails.

Heat-Treat High-Side Rails

By F. J. Voss

Vice-President and Chief Engineer, Duluth, Missabe & Iron Range, Duluth, Minn.

From our experience heat-treated rails appeared to have superior qualities in resistance to shelling and detail fracture. In March 1943, 36 heat-treated, 112-lb. RE rails were laid in a 2-deg. and a 4-deg. curve on track over which passes the heaviest traffic on our road. On the high side of the 2-deg. curve, 21 control-cooled rails were laid at the receiving end followed by 26 heat-treated rails. On the high side of the 4-deg. curve, 10 control-cooled rails were laid followed by 10 heat-treated rails. On the low side of this curve, 9 control-cooled rails and 10 heat-treated rails were placed. The heat-treated rails were 33 ft. long. Both of these curves are on a 2.04-per cent grade over which "down-bound" traffic passes. There is heavy sanding on this track.

On the high side of the 2-deg. curve, six of the 26 rails are still in service after about 288,000,000 tons have passed over them. In August 1951, 11 of the 26 rails were still in the track, but five rails were removed early in 1952 because of the surface conditions. By 1951 the average tonnage carried by the 11 heat-treated rails was 228,950,000. The companion group of control-cooled rails on the other half of the high side of this 2-deg. curve was removed in October 1946 because of shelling and other defects after carrying 121,000,000 tons.

The heat-treated rails on the high side of the 4-deg. curve were not removed until the early summer of 1951 when they had carried 238,-

400,000 tons. At that time several of these rails were in good condition, but were taken out as a part of the general relay program. On the other hand, the control-cooled rails had been removed in 1947 after carrying only 125,000,000 tons.

On the low side of this 4-deg. curve, 5 of the 10 heat-treated rails laid in 1943 are still in service. These rails have carried 288,000,000 tons of traffic. In 1951 four heat-treated rails were removed, after 253,000,000 tons, as part of a rail relay program adjacent to the test section; otherwise the rails would not have been taken out of track at that time. It is quite likely that the four heat-treated rails would still be in service. The companion control-cooled rail on the low side of this curve was removed in April 1951 at 245,500,000 tons. This removal was made because of heavy lateral head-flow, which took place principally in the preceding year.

The heat-treated rail exhibited a marked resistance to shelling compared with the control-cooled rail. Three of the 26 rails placed on the high side of the 2-deg. curve were noted as having light shelling in 1947 and 1948. No case of detail fracture was found or reported in any of the rails.

On the basis of our experience, the life of heat-treated rail on the high sides of curves on heavy-traffic lines is at least double the life of control-cooled rail. On the low sides of these curves, the life of heat-treated rail does not appear from our results to justify its use, although it did resist lateral flow to a greater degree than control-cooled rail.

It would seem that the use of heat-treated rail, if available at a moderate additional cost, would be economical in specific cases where the traffic density is sufficient to warrant the additional cost of this rail. However, heat-treated rail is not a panacea and we are looking forward to a shelly-resistant rail of some alloy or heat-treated combination.

Re-Shortening of Truss Eyebar Members

Should flame-shortened eyebar members of a pin-connected truss be retightened by this method when they become loose? If so, how frequently should the tightening be done? What factors determine this frequency? Explain.

Poor Work Means Doing Over

By G. L. STALEY

Bridge Engineer, Missouri-Kansas-Texas, St. Louis, Mo.

Flame shortening of eyebar members in pin-connected spans is now a standard practice on most American railroads. The matter of effect on the metal has been settled to the satisfaction of most of the engineers concerned by tests in qualified laboratories. Other methods of eyebar shortening have been found wanting.

This shortening of eyebars is made necessary by wear on eyebar holes and the pins, not by lengthening of the bars. If any re-tightening is ever necessary, as noted in the set up of this question, the bar was not properly tightened in the first place. The wear is due to motion of the bar about the pin. Very little, if any, wear is due to straight bearing, so it seems quite certain that any additional shortening will be necessary only when additional wear has occurred during a time roughly equal to that which caused the first wear. Instances have occurred when more than one attempt at bar shortening has been done. We have had several of them —generally the bar in the member not shortened. When re-tightening was necessary on the bar first shortened, a bad job was done in the first shortening. This practice occurs too frequently.

It is questionable if a slack bar in a two-bar member can be made too tight. The average eyebar, say of 10 to 20 sq. in. in section, cannot be pulled up to any great strain by the rig commonly used. When a shrunken bar appears too tight, the other bar has wear on the joint that shows up because originally it was tighter than the shrunken bar, and the situation was reversed by the shrinking of the loose bar.

Flame shortening of eyebars is a good practice but still depends for success on the judgment and conscientiousness of those doing the work.

Why Lower Gradients in Hump Yards?

There is a trend toward the use of lower grades in the body tracks of hump-retarder classification yards. What considerations or developments have brought about this trend? Explain.

Low Gradients Best

By J. J. O'TOOLE

General Manager, Lines East, Chicago, Milwaukee, St. Paul & Pacific, Chicago

Many of the older yards on the Milwaukee System, in common with those on other railroads, were built many years ago on grades that were perhaps considered good practice at the time the yards were built. Several years ago, in connection with revision of a so-called flat yard at Milwaukee, Wis., in which a 0.30-per cent grade was involved in the body tracks, necessitating the use of riders on loads, it was deemed advisable to make a field check of the performance of identical cars on various grades to determine what was an accelerating or decelerating grade for modern equipment. This check produced some interesting results in that it demonstrated that, on a track in good line and surface and well ballasted, an average load would accelerate on a 0.20-per cent grade. As a result of these studies and other data that were secured during the field checks, several of our flat yards have been reconstructed with grades on the body tracks varying from 0.11 per cent to 0.17 per cent.

Because of the satisfactory earlier revisions in our flat yards, it was decided that, in converting the Air Line yard at Milwaukee from a flat yard to a retarder yard, we would adhere to a grade of 0.15 per cent in the body tracks. The results we have obtained thus far justify that decision.

We must not overlook the fact that if you have established an accelerating grade beyond the last retarder, the speed of a car cannot be controlled in mild weather after it leaves the last retarder. On the other hand, in cold weather the speed of the car through the last retarder may be increased to compensate both for the slower running characteristics of the car and the lesser grade.

One might think that a yard so flat, would require frequent trimming of the leads or pulling the tracks down. On the contrary, my observation has been that we have not had to pull down tracks or trim the leads any more than some of our neighbors who have hump yards with much steeper grades. The occasional hard runner, or car that may have a hand brake partially set or the air not completely bled off, will stop just about as fast on a 0.20 per cent grade as it will on a 0.15 per cent.

Flat Grades Reduce Damage

By F. A. Hess

Assistant Chief Engineer,
New York Central, Chicago

Table A on page 301, Vol. 53 of the 1952 Proceedings of the American Railway Engineering Association, shows the grade of the body tracks in the more recent hump yards. Most of the body-track grades are 0.20 per cent, although one yard has a grade of 0.18 per cent, another 0.17 per cent, and one very recent yard has a grade of 0.15 per cent. The earlier yards and several of the yards constructed between 1944 and 1945 were designed with grades of 0.25 to 0.30 per cent in the body tracks.

It has been found that the flatter grades will permit satisfactory rolling of the cars without excessive speed, which in turn permits better control of humping operations and coupling speeds, resulting in less force when coupling and consequently less damage to the cars and their contents. This would indicate that the rolling resistance of cars is less than our earlier assumptions, and perhaps this is due to the design of the newer freight cars, particularly their journals.

The flatter grades tend to eliminate the use of skates and where skates are necessary they can be located near the leaving end of the hump yard. Yards having heavy grades require the application of skates well toward the hump end of the yard. The car with the skate under it is subsequently pushed along the track as more cars are humped onto it. A skate occasionally becomes stuck at a rail joint, causing cars to be derailed if pushed with sufficient force.

We have two yards in the Chicago area, one of which has already been regraded through the body of the yard, and the other one will be regraded next Spring so as to provide a 0.20-per cent grade. It was not economically feasible to reduce this grade any more. I understand that the 0.15-per cent grade in the Milwaukee yard is working satisfactorily and it is my view that we might well give consideration to grades below 0.20 per cent if possible to do so. It should be understood, however that special conditions might require grades above 0.20 per cent.

In my opinion the trend toward flatter grades is due to experience indicating that these grades are sufficient to move cars through the body of a yard and that with these flatter grades and proper hump retarders we can control the speed so that the damage to cars and equipment is reduced to a minimum.

Flatter Gradients Progressive

By N. C. L. Brown

Assistant to Vice-President,
General Railway Signal Company,
Rochester, N. Y.

From the time the first retarder hump was built at Gibson, Ind., on the Indiana Harbor Belt, it has been recognized that the body-track gradient should be sufficient to maintain the speed of an easy-rolling car but should not provide acceleration for it. The only information available at that time concerned the rolling resistance of cars in trains as it affected the tonnage rating. The first yards were designed accordingly.

Experience in the early yards and the results of many subsequent tests developed the fact that the rolling of a car, influenced by gravity alone and resisted by headwind and individual characteristics, such as journal friction (affected by temperature), flange resistance resulting from the condition of wheels, and the difference in diameter of wheels on an axle, responded in accordance with resistance values different from those encountered in trains. At that time, 6 lb. per ton (0.3-per cent equivalent gradient) was considered a minimum. Now, this value has been determined to be as low as 2 lb. per ton (0.1-per cent equivalent gradient) on tangent track.

In the early designs of the hump end of classification yards a retarder was placed on each classification track so that each car or cut of cars could be retarded to a speed proper for coupling with other cars after it had left the ladder track and therefore such speeds could be very low, without restricting the movement of other cars. Consequently some acceleration could be tolerated and compensated for by the use of low car speeds leaving the retarder.

The advent of the group-type yard, where 5 to 10 tracks are served by one retarder, imposed different conditions and more careful attention was needed in selecting the gradient for body tracks. In the group-type yard, the car speeds leaving the retarder must be such that cars will move several hundred feet before reaching clearance as quickly as possible and the spacing between following cars should be at least 55 ft. to permit the operation of switches between them, so as not to restrict humping capacity. Further requirements are that, to avoid damage, the speed at the point of coupling with other cars shall not be more than 4 m.p.h., and that cars run full length of the classification track to make all couplings and avoid trimming.

These conditions are ideal and the ideal is seldom attained. However, it serves as a goal toward which efforts are directed. The trend toward the use of lower grades is the result of such efforts.

It was found that the 0.3-per cent gradient used in early designs, and even 0.25 per cent, would accelerate too many cars and that the hump speed had to be reduced below the usual 2-m.p.h. speed to provide proper spacing between cars, along with safe coupling speeds. Gradients as low as 0.2 per cent are now common and 0.18 per cent has been used in one yard and 0.15 per cent in another.

It has been found also that compensation for curvature by gradients caused acceleration of too many cars. To obviate this, cars had to be released from the group retarder at speeds low enough to restrict the hump speed. To offset this restriction, many yards do not have curve compensation in the grades between the group retarder

and tangent track and cars are released with enough speed to overcome the curve resistance.

Long classification tracks are seldom filled without shoving from the hump end, and a smaller percentage of couplings are made. Whenever a car stops short of coupling with other cars on the track, the only open coupler (the one on the head end of the car) is likely to be closed by impact from a coupling made by a following car. To make couplings when this occurs, a switchman must open the knuckle; consequently the handling of all cars on that track is delayed. A higher percentage of couplings on a classification track will be made if the running of cars by gravity is restricted to 50-car lengths.

A mechanical device, invented by D. W. Brosnan, operating vice-president of the Southern, and used in the Southern's John Sevier yard and Ernest Norris yard, places a Celotex wedge in the open coupler to prevent its closing by impacts such as described above. This device certifies the making of a very high percentage of couplings and saves considerable time in transferring cars from the classification yard to the departure yard.

The trend, therefore, is to provide body-track gradients which are non-accelerating in every sense of the word, and which depend upon releasing cars with sufficient speed to run them to couple with other cars with safety.

Trend Aimed at Less Impact

By William W. Hay

Associate Professor, Railway Civil Engineering, University of Illinois, Urbana, Ill.

The trend toward lower gradients in the body tracks of hump-retarder classification yards is aimed at reducing damage to cars and lading which result from excessive coupling speeds and impacts. The reductions in gradient are made possible and necessary by improvements in track and equipment.

The design of any gravity yard must take account of two situations: (1) The loaded, free-rolling car with low unit car resistance; and (2) the empty, hard-rolling car with a high unit car resistance. Where control of car speeds was exercised by car riders, the main problem was to make the hump high enough so that all cars would run to the far end of the yard. The car rider had control of the car at all times and could brake the car, whether hard or easy rolling, to a safe coupling speed before impact with cars already on the track. Where there was a preponderance of empty cars, gradients of 1.00 per cent were used through ladders and 0.70 per cent on at least the initial portion of body tracks. For loaded cars, the gradients were 0.70 and 0.30 per cent.

With retarder operation, no control is had over the car once it leaves the last retarder. Gradients below the last retarder must be adjusted to avoid acceleration and excessive coupling impacts. When rider yards were converted to retarder operation, existing gradients were used or reduced to no lower than 0.25 per cent to 0.30 per cent. Experience has shown that such grades cause excessive acceleration, speed, and damage from coupling impacts. Cars roll easier and faster today than in the earlier days of retarder operation. Better design, lubrication, and maintenance of car journal bearings and of car trucks and wheels account for a part of the increase in rolling speed. Heavier and stiffer rails reduce the resistance due to rail bending or deflection. The fan type of yard layout reduces the average number of turnouts and the amount of curvature a car must pass through to reach a given track.

Since all cars do not roll at the same speed, it is necessary that the gradient below the last retarder be such that the easy-rolling loaded car will not accelerate above the safe coupling speed with which it should leave the last retarder. That safe coupling speed has been found by experience and test to be about 4.5 m.p.h. In addition the total drop from the crest of hump to the clearance point of the body track must give the hard-rolling empty car sufficient velocity head or momentum to carry it at least past the clearance point of the body tracks to avoid "cornering" other cars. The empty car is usually not given any retardation by the retarder operators.

Since the accelerating effect of gradients (and also the resistive effect) is 20 lb. per ton per one per cent of gradient, unit resistance divided by 20 lb. gives the gradient which will overcome car resistance at the speed for which the resistance is assumed and let the car continue to roll without acceleration.

There is a problem of what value to use for the resistance of easy rolling cars. The Davis formula gives values of 3.2 lb./ton for 70-ton cars, 4.4 lb./ton for 40-ton cars, and 7.3 lb./ton for 20-ton (empty) cars at 4.5 m.p.h. The American Railway Engineering Association in its Proceedings for 1932, Vol. 33, pp. 210-213, suggests the use of 4.4 lb./ton for easy-rolling cars of 70 tons and over, 5 lb. for easy-rolling cars under 70 tons, and 6 to 8 lb./ton for empty, hard-rolling cars. Experience and tests under recent conditions indicate a gradient of 0.20 to 0.22 per cent equivalent to 4.0 to 4.4 lb./ton as being non-accelerating for easy-rolling cars within the speed ranges with which those cars should leave the last retarder.

The 4.0 lb./ton is only an average value since actual car resistance for any individual car will deviate, depending upon the weather and temperature, condition of the track, wear of rails and wheel treads, and the speed with which the car leaves the last retarder. The leaving speed may be less than 4.5 m.p.h. depending upon the ability of the retarder operator to estimate and regulate speeds through the last retarder. The 0.20 per cent or lesser gradient is carried about 500 to 2000 ft. into the body track and sometimes for the full length of that track depending upon its overall length and the general slope of the terrain. It may then taper off to a level grade. A slightly adverse gradient (not sufficiently steep to cause cars to roll backwards) keeps cars from going beyond the clearance point at the end of the yard.

Local conditions also influence the design of body-track gradients. Where only loaded cars are classified, the body track's non-accelerating gradient can be even less than when empties are also handled. Thus in a yard devoted to classifying only loaded cars of coal, a gradient of only 0.19 per cent has been used on one road. Other roads have used 0.17 to 0.15 per cent. More powerful retarders which can control loaded cars at higher speeds permit steeper gradients above the last retarder thus assisting the movement of hard-rolling cars and permitting flatter gradients on the body tracks. The incidence of prevailing head or tail winds or extremes in temperatures call for variations in design. When winds are light or act to assist the rolling car, body-gradients can be lighter than otherwise. When winds are adverse, gradients may have to be heavier. A yard which experiences mild temperatures can use a lower gradient than one that is subject to

low temperatures part of the year. The weight to be given these factors is a matter of judgment and of experience with a particular locality.

Switches and curvature add resistance to car movement. Opinions differ as to the need for including an allowance for these elements in the design. If curve oilers are used, curve and turnout resistance are more likely to be ignored. Inclusion of these elements requires a greater height of hump, sometimes obtained by increasing the gradient slightly on those tracks which introduce the maximum number of turnouts and degrees of central angle. The gradient through the retarder and for the next 200 to 300 ft. through ladders and turnouts may also be made steeper, from 0.8 to 1.0 per cent. This feature aids in getting the cars away from the retarder and turnouts more quickly to make room for following cars and assists hard-rolling cars. If the curves are compensated, no further account need be taken of the curvature of the track.

Automatic Steam Generators for Shops

What are the advantages and disadvantages of using automatic steam generators to heat shops? Other railway buildings? Explain.

Uses Are Expanding

By N. O. Kirkby

Executive Engineer,
Vapor Heating Corporation,
Chicago

Although originally designed for use in diesel locomotives to heat passenger trains, automatic, coil-type steam generators have proved that they have many advantageous uses in railroad shops, coach yards, offices and depots. Some of these advantages include:

(1) *Lower installation costs* — Since automatic coil-type steam generators are complete package units, mounted on a base plate, run and tested at the factory, they are ready to produce steam as soon as water, fuel, current and steam connections are made. No walled-in area, special room or building is needed. No high stack is required because the draft is forced. The units, being small, can be located at various places in a large coach yard, thereby cutting down cost and labor of laying steam pipes. All of these factors reduce installation costs.

(2) *High and low steam pressure available* — By turning one control, steam pressure may be changed from 10 to 300 psi. or up to 600 psi. Conventional boilers which supply 300-lb. pressure are more expensive than those which supply 10 to 15 lb. pressure.

(3) *Automatic controls* — Once started, automatic controls take over, causing the steam generator to cycle on and off as needed to supply the desired steam. A servo-control meters the fuel, water and air to maintain high efficiency at various degrees of output. Automatic blowdown and refilling controls are also available. A man can learn to operate a coil-type steam generator in a few hours of instruction.

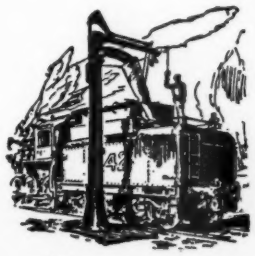
(4) *Safety factors* — No reservoir of water is heated under pressure; hence the units cannot blow up. Many safety devices have been incorporated into the machine, such as steam temperature limit control; no-water, no-fire, stack-temperature cutouts; electric-eye controls on some units; and others. An alarm bell or light signal may be wired to the steam generator, and placed in a shop or yard where men are working to give an automatic signal if the unit is not working properly.

(5) *Master control* — One or several units can be operated by a master control which turns one, two, or seven or more units on as needed to meet a changing steam load, then refills the coils after each unit is turned off. Most coach yards and shops have widely changing steam loads during a 24-hr. day.

(6) *Use gas or oil* — Stationary units may burn natural gas or fuel oil by turning one control or are made to burn either fuel with equal efficiency.

(7) *Output fast and variable* — Steam generators develop full working steam pressure and output in two minutes from a cold start.

(8) *Easily maintained* — All railroads operating diesel locomotives have parts for coil-type steam generators and men experienced with these units who can check them occasionally. The coils can be chemically washed in two hours by making only three connections on the outside of the unit. The time to do this is easily determined by reading the water-pressure gauge. The coil-washing work can be minimized by lengthening the time between cleanings through the use of treated water. The better the water is treated, the longer the periods between coil washings.



Have Many Advantages*

Since the start of our dieselization program, we on the Texas & Pacific have experienced a gradual decrease in the amount of steam used from our stationary boilers as the number of diesels increased. Under steam locomotive operation, heavy use of steam was required for many purposes, including the operation of the boiler washout plant, the direct steaming of locomotives, the pumping and heating of fuel oil, the operation of sand dryers, and steam-driven air compressors. When dieselization became complete, these uses, were either eliminated or greatly reduced, leaving the cleaning of diesel filters and the heating of shops, offices, and other facilities as the major need for steam.

This development has made it necessary to look into power-plant operation costs. Under steam operation it was necessary to have stationary boilers under fire three shifts (around the clock). Some economies have been effected since dieselization by shutting down the boilers during certain periods of the day when no steam is required. However, during the heating season, boilers must be kept on line full time.

* This answer was received from W. F. Kascal, mechanical superintendent Texas & Pacific, Dallas, Tex., with the statement that it was prepared jointly by F. R. Denney, assistant mechanical superintendent, Dallas; J. H. Webb, master mechanic, Big Spring, Tex.; and R. L. Eiland, general foreman, El Paso, Tex.

The usual shop boilers include locomotive, scotch marine, and water-tube types, all of which are only partially adaptable to automatic operation. For the most part they require constant attention. In contrast steam generators are fully automatic. They do not have a large volume of water under pressure and do not require an attendant. The units are equipped with alarms consisting of warning bells or buzzers that are wired to a location where some employee is always on duty. This guards against a steam generator shutting down over extended periods of time.

An investigation made on our power-plant operation developed that labor costs for attendants was from 40 to 50 per cent of the total operating costs. Virtual elimination of this expense by installing steam generators usually results in considerable savings.

Steam generators are equally as efficient as most other types of boilers in this type of service. They do require a good grade of treated water and this fact must not be neglected in figuring on the conversion of a plant.

On the Texas & Pacific we have converted plants at several points from conventional equipment to steam generators. In some cases where there was a heavy load we have installed motor-driven air compressors. Other plants are being studied with a view of installing additional steam generators where they offer the best solution.

Summing up the answer to this question, I would say that the advantages and disadvantages of a steam generator are the same to heat shops or other railway buildings as for any other installation. Briefly outlined, the advantages follow:

(1) Steam generators are completely adaptable to automatic controls; (2) they do not need attendants; (3) they can be equipped for either gas or diesel fuel oil, with the change-over being made quickly; (4) they show good savings on investment; (5) they reduce operating costs; (6) their control equipment automatically adjusts to load changes; (7) they are made in various sizes, from 15 hp. to as much as 450 hp.; (8) they can be fired from cold to full operating pressure in two minutes; (9) they do not require heavy foundations, separate buildings or expensive stacks; (10) steam generators require less floor space per unit of steam output; (11) when applied in multiple, they provide greater operational flexibility than other types.

Steam generators do have some disadvantages, such as: (1) They require a better treated water than conventional boilers, resulting in additional treating facilities and higher water costs (frequency of washing tubes with acid depends on the quality of water used); and (2) they cannot be rated beyond their capacities. We do not have sufficient experience to give a definite answer as to the maintenance cost or life of steam generators versus conventional boilers.

Packaged Units Are Compact

By A. R. Frampton

President, Railroad Supply & Equipment, Inc., Scranton, Pa.

WHEN installing automatic steam generators in shops, stations, or other railway buildings, there are many advantages in using packaged units. Such units are shipped ready for installation on a boiler-room floor, and when connected to steam, water, fuel and electric lines, are ready for operation. It is not unusual to have a unit in operation within 24 hr. after its arrival.

Each unit is a complete steam-producing plant and includes insulation with a jacket for the shell of the pressure vessel and all necessary refractories which have been installed prior to shipment. In addition to this standard equipment the plant includes a feedwater pump, a condensate tank, an injector, a main steam valve, and blow-off, check and feed valves.

Each compact unit, having been fire tested prior to shipment, under conditions approximating those in the field as nearly as is possible, is ready on arrival to be installed in a minimum of space in the boiler room.

Not the least of the advantages of packaged units is the minimum of physical facilities required for their installation. For instance, our unit requires no special foundation —simply a level boiler-room floor, preferably of concrete. It also requires a very small stack. In fact, a 500-hp. unit needs a stack only about 28 in. in diameter and only long enough to extend three to five feet above the top of the nearby buildings.

These units are extremely clean in operation and, although it is recommended that both the fire and water sides of furnace and tubes be inspected at least once a month, experience of individual operators has indicated that, where a unit is properly fired and where the boiler water is blown down regularly, the cleaning interval can safely be extended to three or four months. When properly fired, these units are practically smokeless and require a minimum of care and attention. They also provide rapid steam generation, requiring only from 15 to 40 min. to raise water at boiler room temperature to steam at 100 lb. pressure.

As is to be expected, each manufacturer of automatic steam generators has incorporated in his design certain features which he believes makes for a better unit. Generally speaking, the major differences in design are found in the type of burner; the size of tubes; the number of hot-gas passes through the unit; the type of baffling necessary to provide these gas passes; and the overall simplicity and accessibility for inspection, cleaning and maintenance.

The three popular burners are: (1) The rotary cup; (2) the air-atomizing burner; and (3) the pressure or mechanical-atomizing type. The rotary-cup burner depends upon centrifugal force to break the oil into sufficiently fine particles to thoroughly mix with incoming air to form a combustible mixture. In the air-atomizing type, a small compressor builds up an air pressure ranging from 15 to 25 lb. which is used to atomize the oil.

In the mechanical or pressure-atomizing type of burner, direct pressure is exerted on the oil, which is forced by this pressure along a spiral passage through an exceedingly small aperture in the burner nozzle where it is thoroughly atomized.

Each of these types has its merits, but I think the mechanical atomization provides the best results in the simplest manner and with a minimum of accessory equipment.

Boiler tubes are provided in sizes ranging from 1½ in. to 3 in. in diameter. Generally speaking, the smaller the tube diameter, the more heating surface can be crowded into a small boiler shell. However, smaller tubes have thinner walls and therefore require more frequent replacement and more frequent cleaning on the fire side. I think that 2½-in. or 3-in. tubes give the best results over long periods of operation and reduce maintenance and cleaning cost to the minimum.

Each type of construction—as regards the number of times hot

gases pass through the unit—has its enthusiastic supporters. Two-pass construction is by far the simplest because it requires but one baffle. The hot gases travel approximately twice the length of the boiler before entering the stack. However, because of this short gas travel it is usually necessary to provide retarders in at least one end of each tube to slow down this gas travel and to prevent the gases from entering the stack at excessively high temperatures.

In three-pass construction, the gas travel is increased 50 per cent; a simple one-piece baffle is required but no retarders are needed; and gas enters the stack at a much lower temperature than with other types of construction.

Four-pass construction has the advantages of long gas travel; low stack temperature and no retarders. But these obvious advantages are more than off-set by complicated baffles at each end of the boiler, making tube inspection, cleaning and replacement a major and an expensive operation.

The baffles in the two-pass and three-pass units are usually provided at the rear end only. They are usually made from inexpensive plastic refractories which can be purchased in any locality and which can be readily installed on the job by any shop maintenance man, whereas the baffles in a four-pass unit are usually special shapes which must be purchased from the boiler manufacturer. They are expensive and require considerable time and some knowledge of the work to install them.

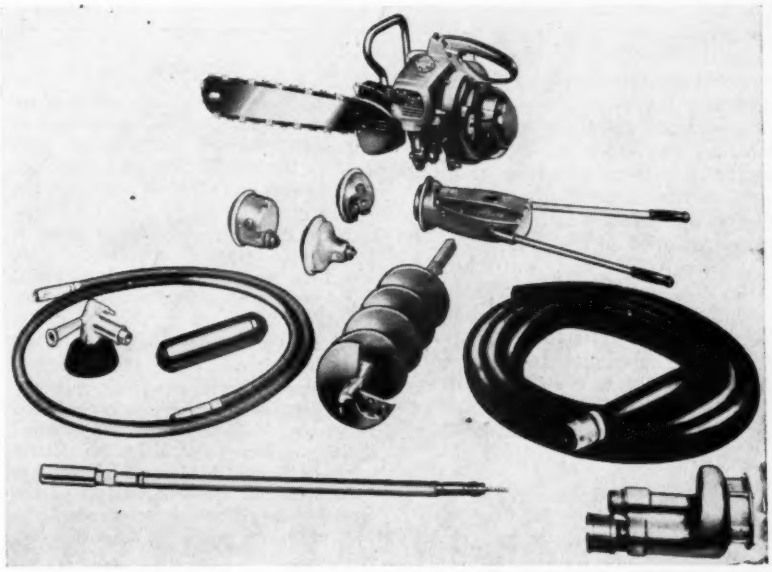
Packaged units are complete, self-contained, automatic boiler plants. They have pumps and strainers for both water and fuel; automatic valves; controls actuated by electricity, steam or heat; firing equipment; motors and fans. Since these must be checked and serviced and, if occasion arises, replaced, it is essential that the equipment, wiring and piping be as simple and as accessible as possible, consistent with good practice.

Handholes and manholes must be provided for inspection and cleaning of the water side of a unit; and doors and cleanout openings must be provided for inspection and cleaning of the fire side. It is essential that all of these can be easily opend and removed, if necessary. Finally the heavier items, such as flue doors and baffles, in the larger size units, should be hung and supported on some type of hinge to facilitate handling.

PRODUCTS OF MANUFACTURERS

New, improved equipment, materials, devices

(For information on any of the products described in these columns, use postcards, page 1166)

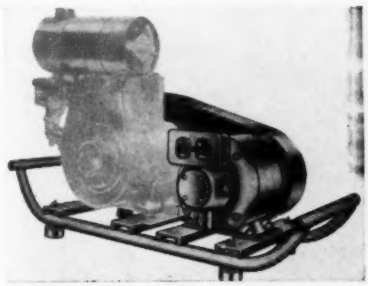


ATTACHMENTS FOR CHAIN SAW

FIVE NEW attachments have recently been made available for use with the new Model 2MG combination gasoline engine and chain saw manufactured by the Mall Tool Company, Chicago. The attachments, which are said to assemble quickly in converting the chain saw, include an earth auger for digging post and pole holes, planting seedlings, boring grease traps and drainage sink beds; a wood drill, using ¼-in. to ¾-in. chucks, for tapping trees or boring holes for all types of construction; a concrete vibrator; a concrete surfacer; and a sump pump for draining trenches, excavations, caissons, tunnels, sewers and rain-swamped areas. The latter attachment is said to have a pumping capacity of about 5000 gal. per hr.

DETACHABLE ENGINE-GENERATOR UNIT

THE Wincharger Corporation, Sioux City, Iowa, has announced a new development in engine-driven electric generators. Available with or without engines, the units feature belted construction designed to make mounting or dismounting of the engine a simple matter. To remove the engine, all that is necessary is to unbolt it from its mounting base and drop off the V-belt. The engine is then available for other uses such as driving concrete mixers, compressors, pumps, and other equipment. When an



emergency power shortage develops or a portable source of electricity is needed, the engine may be quickly reassembled with the generator. The generator, engine-generator mounting base, belt guard, generator and engine pulleys, and V-belt are furnished as a package, thus enabling the user to furnish his own engine if he so desires. The engine mounting base is drilled to receive several makes of engines.

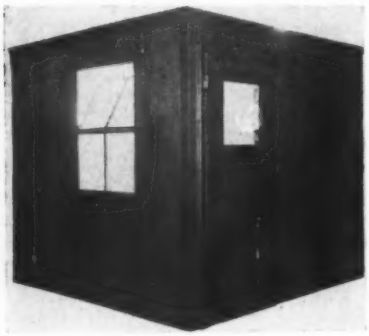
For additional information on any of the products described below, use postcards, page 1166.

ROLL SHEETING FOR WATERPROOFING

THE Rubber & Plastics Compound Co., Inc., New York, has announced the availability of a new product, called Nerva-Clad, designed to waterproof structural steel, reinforced concrete, tanks, tunnels, pipelines, etc., and protect them from corrosion. Nerva-Clad is a membrane of synthetic rubber which is molded about a woven mesh of spun glass. The manufacturer claims that the materials used in the manufacture of Nerva-Clad are outstanding for their resistance to moisture, oxidation, corrosion and climatic changes. It is said that the glass fiber in the sheeting acts very much like reinforcing bars in concrete in that it provides high tensile strength and dimensional stability to the membrane.

"PACKAGE-TYPE" STEEL BUILDINGS

THE UNION Asbestos & Rubber Co., Chicago, has recently put on the market "packaged" steel buildings which can be used for bunkhouses, utility buildings, storage facilities, garages, and many other uses. Employing standardized elements, "Unarco" buildings can be easily expanded lengthwise by the addition of extra units. The steel panels and studs lock together



without the use of bolts, rivets, or other fastening devices, and are said to hold together securely. The wall units can be obtained with or without insulation and are available in both single-wall and double-wall types. Doors and windows can be inserted wherever desired.

Changes in Railway Personnel

General

J. L. Forrester, formerly assistant supervisor of track on the Pennsylvania at Alliance, Ohio, who has returned from military service, has been appointed acting assistant trainmaster—night on the Maryland division.

James B. Gregory, division engineer on the Seaboard Air Line at Raleigh, N. C., has been appointed general industrial agent with headquarters located at Norfolk, Va.

R. H. Carter, superintendent of the Mississippi division of the Illinois Central at Jackson, Tenn., and an engineer through training and experience, has been transferred to the New Orleans terminal division at New Orleans, La. Mr. Carter succeeds **Samuel J. Massey, Jr.,** who has been appointed general manager of the Grand Trunk Western, succeeding **A. C. McCarthy,** who is on leave of absence due to illness.

James B. Clark, assistant to the general manager of the Louisville & Nashville at Louisville, Ky., and an engineer by training and experience, has been promoted to superintendent of the Louisville division at the same location.

Mr. Clark entered the service of the L&N in 1937 as a draftsman and subse-

James B. Clark

quently advanced through several positions to assistant division engineer at Birmingham, Ala., in 1945. Two years later he was advanced to division engineer, and in July 1950 was named assistant to the general manager, the position he held prior to his recent promotion to superintendent.

C. H. Manning, acting trainmaster of the Peninsula subdivision of the Chesapeake & Ohio at Richmond, Va., and formerly assistant division engineer at Hinton, W. Va., has been appointed trainmaster of the Peninsula subdivision. **F. G. Cobb,** acting assistant superintendent of the Hinton division at Hinton and formerly a division engineer at Richmond, has been appointed assistant superintendent of that division. **C. C. Madison,** assistant superintendent at Hinton, and an engineer through training and experience, has been transferred to Peach Creek, W. Va.

Engineering

F. H. Hibbard, engineer maintenance of way of the Quebec Central at Sherbrooke, Que., retired recently after 39 years of service.

Francis B. Peter, assistant division engineer on the Southern Pacific at Oakland Pier, Cal., has been appointed assistant engineer with headquarters at San Francisco.

J. H. Estes, has been appointed assistant to the chief engineer of the Kansas City Southern with headquarters at Kansas City Mo.

P. S. Settle, division engineer on the Pennsylvania at Williamsport, Pa., has been transferred to the Eastern division at Pittsburgh.

Frank A. Mezger, chief clerk to vice-president of the Chesapeake & Ohio, has been appointed assistant to chief engineer of the Chesapeake district with headquarters at Richmond, Va., to succeed **W. F. Drumeller,** who has retired.

W. B. Barber, supervisor of track on the Columbia division of the Southern, with headquarters at Batesburg, S. C., has been appointed engineer maintenance of way and structures of the Washington & Old Dominion at Leesburg, Va., succeeding **T. C. Dorsey,** who has recently resigned.

G. B. Mercer, roadmaster on the Portage division of the Canadian Pacific, with headquarters at Winnipeg, Man., has been promoted to division engineer at Regina, Sask. **R. R. Morrish,** roadmaster at Ottawa, Ont., has been named division engineer of the Bruce division at Toronto, Ont.

J. C. Williams, who has been appointed engineer of buildings of the Seaboard Air line at Norfolk, Va., (RE&M, November, p. 1110), was graduated from North Carolina State college in civil engineering and entered the service of the Seaboard

(*Continued on page* 1208)

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at Norfolk in 1916 as a draftsman. He was promoted to chief draftsman in 1920, engineer of buildings in 1926, and engineer of structures in 1943. In the following year Mr. Williams was named office engineer in the consolidated engineering department of the Seaboard and in 1948 he became assistant engineer of buildings, the position he held at the time of his recent promotion.

J. C. Williams

J. A. Hawley has been appointed assistant division engineer of the Ohio division of the New York Central at Springfield, Ohio, succeeding **R. L. Geis,** who has been promoted to division engineer at Mattoon, Ill. Mr. Geis succeeds **Lyle Bristow** who has been transferred to Springfield, replacing **C. V. Talley** who, as noted elsewhere in these columns, died recently.

M. B. Hansen, assistant division engineer on the Canadian National at Prince B. C., has been promoted to division engineer on the Hudson Bay division with headquarters at The Pas, Man., to succeed **H. E. Amos,** who has been transferred to the Winnipeg terminals. **F. A. Hunt,** division engineer on the Capreol division at Capreol, Ont., has been transferred to the Belleville division, with headquarters at Belleville, Ont., to replace **R. A. Shier,** who has resigned.

Sidney F. Grear, who recently retired as assistant engineer of bridges on the Illinois Central at Chicago (RE&M, October, p. 1022), was born in 1885 at Anna, Ill. After graduating from the University of Illinois in 1907, Mr. Grear entered the service of the IC as an engineering apprentice on the Louisville division. In 1909 he was assigned to the bridge and building department at Chicago, and in 1913 was promoted to chief draftsman. From 1921 to 1926 he served as assistant engineer in the office of the chief engineer, and in 1927 was named assistant engineer of bridges, the position he held at the time of his recent retirement.

Elmer A. Johnson, recently appointed assistant engineer of bridges on the Illinois Central at Chicago (RE&M, October, p. 1022), was born December 15, 1897, at Rock Island, Ill. In 1922 he graduated from the University of Illinois and in October of the following year entered the service of the IC as a masonry inspector in the bridge department. He was promoted to chief designer in that department in 1944, and on August 1, 1947, was named assistant to the engineer of bridges, the position he held prior to his recent promotion.

Elmer A. Johnson

C. R. Harrell, principal assistant division engineer on the Seaboard Air Line at Jacksonville, Fla., has been promoted to division engineer on the Alabama division with headquarters at Americus, Ga., succeeding **J. R. Alcorn,** who has been transferred to the Virginia division at Raleigh, N. C., to replace **James B. Gregory,** who, as announced elsewhere in these columns, has been appointed general industrial agent at Norfolk, Va. **E. L. Russell,** assistant division engineer on the Alabama division, has been promoted to principal assistant division engineer with headquarters as before at Americus, which is a newly created position on that division. **A. J. Trzeciak,** principal assistant division engineer at Tampa, Fla., has been transferred to Jacksonville, Fla. **A. C. Jones, Jr.,** assistant to division engineer at Jacksonville, has been promoted to assistant division engineer with headquarters continuing at Jacksonville. **J. J. Vereen, Jr.,** assistant to division engineer, has been promoted to assistant division engineer of the Virginia division with headquarters as before at Raleigh, N. C.

Mr. Harrell is a native of Potecasi, N. C., and received his B.S. degree in civil engineering from North Carolina State college. He became associated with the Seaboard in 1934 and served in various engineering capacities in Charleston, S. C., Atlanta, Ga., Richmond, Va., and Hamlet, N. C. In 1945 he was named assistant division engineer at Savannah, and in July of last year was appointed principal assistant division engineer at Jacksonville.

C. R. Harrell

Mr. Russell was born at Newberry, S. C., and attended the universities of North Carolina and South Carolina. Entering the service of the Seaboard in 1941 in the engineering department on the South Carolina division, he was promoted to assistant division engineer on the Alabama division in 1947.

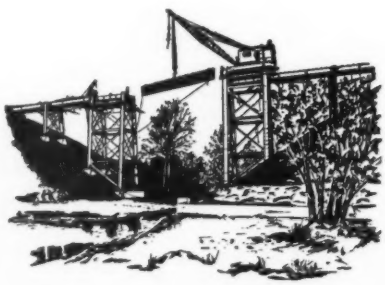
Mr. Vereen began his career with the Seaboard in November of last year and has been stationed in Raleigh during his connection with the railroad.

Mr. Jones has been stationed in Jacksonville since June of last year, serving in the engineering department of the Seaboard.

E. J. Napier, whose promotion to engineer of bridges of the Central region of the Canadian National at Toronto was announced recently (RE&M, September, p. 908), is a native of Victoria, Ont. He commenced his railway career as a call boy and subsequently served the railroad in various temporary positions in Northern Ontario until 1927, when he became structural draftsman in the bridge engineer's office at Toronto. In 1943 Mr. Napier was promoted to structural field engineer at Toronto, and six years later was appointed assistant engineer of bridges of the Central region, the position he held at the time of his recent advancement.

R. B. Fetters, district maintenance engineer on the Rock Island at Kansas City, Kan., has been appointed maintenance engineer, First district, with headquarters at Des Moines, Iowa. **R. W. Lucas,** district maintenance engineer at El Reno, Okla., has been named maintenance engineer, Second district, with same headquarters. **J. W. Shurtleff,** district maintenance engineer at Des Moines, has been appointed division engineer at the same location, succeeding **R. M. Bristow,** who has been assigned to other duties. **G. A.**

(*Continued on page* 1210)



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The "Aladdin" has no pumps or valves. A spring-loaded piston, the *only* moving part, descends in a cylinder under vibration from traffic—and delivers the required amount of standard grease *automatically* to the running side of the rail.

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No track alteration, rail drilling or gauge widening is required to install the "Aladdin". And since it weighs only 50 pounds—it can be handled and installed by one man *in less than half an hour.*

Proved performance:

Today, thousands of "Aladdin" Lubricators are in use on main lines...in yards...under one or two-way traffic...in all climates. The "Aladdin's" low cost means you can now economically specify a lubricator for *every* rail wear location. Why not check *your* lubricator requirements today? Write for Bulletin A.

H. T. KENNEDY COMPANY, Inc., 37 Wall St., New York 5, N.Y.

Carroll, division engineer at Liberal, Kan., has been transferred to El Reno, and **C. U. Kitzmiller**, division engineer at El Reno, has been named assistant division engineer at Liberal. **H. E. Womack**, division engineer at Ft. Worth, Tex., has been appointed assistant division engineer at that location.

David C. Hastings, who has been appointed division engineer of the Richmond, Fredericksburg & Potomac at Richmond, Va., (RE&M, Novmber, p. 1110), was born at Ashland, Va., on December 25, 1915, and was graduated from Virginia Military Institute with a B.S. degree in civil engineering in 1937. He began railroad service on the Pennsylvania as an engineering apprentice at Elmira, N. Y., on July 15, 1937, and subsequently held the positions of assistant on the engineer corps and assistant supervisor of track at various locations until October 31, 1943. On the latter date Mr. Hastings entered military service as a 2nd lieutenant in the 706th Railway Grand Division in the European Theatre of Operations, and was discharged with the rank of major on March 16, 1946, when he returned to the Pennsylvania as a supervisor of track at Buffalo, N. Y. The following December he went with the RF&P

David C. Hastings

as supervisor of track at Potomac Yard and later served in that capacity at Fredericksburg, Va. On June 16, 1952, he was named supervisor of safety at Richmond, the position he was occupying at the time of his recent promotion.

Richard A. Ullery, whose appointment as assistant to the chief engineer of the Bessemer & Lake Erie at Greenville, Pa., was announced recently (RE&M, November, p. 1110), was born at Pittsburgh, Pa., on November 28, 1905. Following graduation from Lehigh University with a C.E. degree in June 1928, he entered the service of the Pennsylvania as an assistant on the engineer corps on the Central region. In February 1931 he was promoted to assistant track supervisor and served in that capacity successively on the Buffalo and Eastern divisions until June 1933, when he resigned to go into private business. In May 1941, Mr. Ullery re-entered railroad service as a draftsman on the B&LE at Greenville. He was promoted to assistant track supervisor at that location in February 1943, to assistant engineer in July 1945, to designing engineer in December 1948, and to chief draftsman in March 1952. He was serving in the latter capacity at the time of his recent appointment.

Track

R. E. Kleist, supervisor of track on the Lake division of the Pennsylvania, has been transferred in the same capacity to the Southwestern division, succeeding **R. R. McClain.**

C. W. Hanson has been promoted to acting roadmaster on the Enid, Stillwater, and Cushing districts of the Oklahoma division of the Santa Fe, succeeding **C. L. Holman**, transferred to the Coast Lines.

C. R. Alberts, roadmaster on the Denver & Rio Grande Western at Helper, Utah, has been transferred to Salt Lake City, Utah, and **W. J. Gill**, roadmaster at Grand Junction, Colo., has been transferred also to Salt Lake City. **Richard E. Davis**, assistant roadmaster at Denver, Colo., has been promoted to roadmaster at Grand Junction, and **Keith Peck**, draftsman, has been named assistant roadmaster at Denver, succeeding Mr. Davis.

W. H. Clark has been appointed acting roadmaster in charge of the second and Estancia districts, including Vaughn and Belen yards, on the Atchison, Topeka & Santa Fe, with headquarters at Belen, N. M., succeeding **J. E. Logsdon**, who is on sick leave.

A. E. Kemp, roadmaster on the Chicago, Milwaukee, St. Paul & Pacific at Savannah, Ill., has been reinstated after having been absent due to illness. **C. H. Schweikert**, acting roadmaster at Savannah, has resumed his former duties as assistant roadmaster elsewhere on the railroad.

Saul Brownstone, transitman on the Canadian Pacific, has been promoted to roadmaster on the Portage division with headquarters at Winnipeg, Man., succeeding **G. B. Mercer**, who, as announced elsewhere in these columns, has been advanced to division engineer at Regina, Sask.

William G. Park, supervisor of track on the Southern at Lawrenceburg, Ky., has been transferred to Princeton, Ind., to succeed **John T. Marlowe**, who has replaced **Mr. Park at Lawrenceburg. Ernest K. Ratliff**, student apprentice at Manassas, Va., has been promoted to assistant supervisor of track at Mooresville, N. C.

Frank Corrigan, who has been promoted to supervisor of track on the New York Central at Richland, N. Y., (RE&M, October, p. 1022), was born at New York on March 14, 1908, and entered the service of the NYC as a track laborer at Weedsport, N. Y., in 1926. He subsequently held the positions of assistant foreman and section foreman at various locations until February 1, 1947, when he was advanced to assistant supervisor of track at South Schenectady, N. Y. The following August he was transferred to Albany, N. Y., where he ramained until he received his recent promotion.

Changes on the Rock Island

B. S. Buskovick, roadmaster on the Chicago, Rock Island & Pacific, at Rock Island, Ill., has been promoted to general roadmaster at the same location, and **R. P. Scott**, trainmaster at Des Moines, Iowa, has been appointed general roadmaster at Des Moines. **F. H. Charles**, roadmaster at Manly, Iowa, has been promoted to general roadmaster with headquarters at Cedar Rapids, Iowa, and **F. E. Detter**, roadmaster at Goodland, Kan., has been promoted to general roadmaster at Fairbury, Neb. **M. D. Lau**, district maintenance engineer at Des Moines, has been appointed general roadmaster at Kansas City, Kan., and **Noble Hurt**, roadmaster at Iiberal, Kan., has been promoted to general roadmaster at Little Rock, Ark. **C. J. Overholser**, roadmaster at El Reno, Okla., has been promoted to general roadmaster at the same location.

E. Gentile has been appointed assistant roadmaster at Blue Island, Ill., **J. K. James** has been named roadmaster at Rock Island, and **E. Rohloff**, roadmaster at St. Joseph, Mo., has been transferred to Trenton, Mo. **F. N. Collins**, acting roadmaster at Eldon, Mo., has been promoted to roadmaster at Peoria, Ill., and **L. E. Cox** has been named roadmaster at Des Moines. **M. H. Bootjer** has been appointed roadmaster at Cedar Rapids, **K. H. Carl** has been named acting roadmaster at Limon, Colo., and **H. W. Deakin**, roadmaster at Dalhart, Tex., has been transferred to Liberal. **D. Sullivan** has been appointed roadmaster at Dalhart, and **Rex Price**, acting roadmaster at Liberal, has been transferred to Chickasha, Okla.

Special

P. L. Koehler, assistant superintendent of the Huntington division of the Chesapeake & Ohio at Logan, W. Va., has been named superintendent of work simplification with headquarters at Huntington, W. Va. Mr. Koehler was born at Hamilton, Ohio, on October 22, 1901, and attended Denison University. He entered the service of the C&O on July 13, 1923, as an assistant foreman at Huntington, and subsequently held the positions of chainman on the system engineering force, instrumentman, assistant cost engineer and supervisor of track. On June 16, 1929, he was advanced to assistant division engineer, in which capacity he served consecutively at Covington, Ky., Huntington, and Russell, Ky. In 1939 Mr. Koehler was promoted to division engineer at Ashland, Ky. He was appointed trainmaster at St. Albans, W. Va., in 1944, and the following year was advanced to assistant division superintendent of the Huntington division.

Obituary

Charles V. Talley, division engineer on the New York Central at Springfield, Ohio, died recently.

(*Please turn to page* 1212)

The Illinois Central reports:

G-E PLATFORM LIGHTING GIVES MOST LIGHT WITH LEAST GLARE

The Illinois Central provides "main street" lighting for its passenger platforms in Chicago's Central Station by using G-E mercury-vapor street-lighting luminaires.

Train Master T. J. Reid reports: "This lighting is a big improvement over other types. The G-E mercury-vapor luminaires give us maximum useful light with a minimum of glare. And only one row of standards is needed to light two platforms and surrounding areas. That means minimum interference in handling baggage and mail trucks."

Ask your G-E representative to show you how General Electric's experience with all kinds of lighting can help you improve your operations. General Electric Co., Schenectady 5, N. Y. 152-32

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One man easily handles this 4 man capacity inspection car!

This rugged, all steel, welded frame car features a light weight reversible transmission coupled to a powerful 4-cycle, air cooled engine and chain drive to the rear axle. Built for utility and comfort, too, the car is equipped with a spring suspended seat that reduces operator fatigue. Whatever your car needs, it will pay to . . .

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MANUFACTURERS OF MAINTENANCE OF WAY EQUIPMENT
Factory and General Offices: Eau Claire, Wisconsin, U. S. A.

Railway Personnel (Cont'd)

Edwin F. Wendt, consulting engineer at Pittsburgh, Pa., and a past president of the American Railway Engineering Association, died recently.

James E. Willett, supervisor of water supply on the Chesapeake & Ohio at Huntington, W. Va., died recently in a traffic accident at the age of 43. Mr. Willett had accumulated 26 years of service with the C&O at the time of his death.

Association News

American Railway Engineering Association

The General Convention Arrangements Committee has scheduled a meeting to be held at Association headquarters in Chicago, January 20, 1953.

To permit the early reorganization of subcommittees for the year ahead, the secretary's office has sent to each committee chairman the names of new and discontinued members of his committee, and a copy of his committee's assignments for the coming year.

At a meeting of the Board of Directors at Chicago on November 7 the report of the Nominating committee, which had met earlier on the same day, was received.

Maintenance of Way Club of Chicago

The club held its second meeting of the season on November 24 at the usual place of meeting, Eitel's restaurant in the Field building, Chicago. Two interesting moving pictures were shown, both taken on the Southern Pacific. One picture told the story of how the railroad repaired damage to its tracks and tunnels

(*Continued on page* 1214)

Join the
MARCH OF DIMES
JANUARY 2 TO 31

JANUARY						
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
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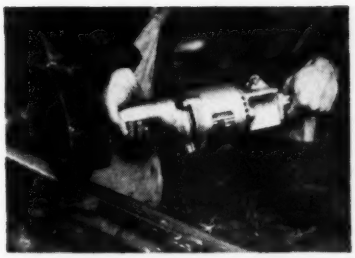
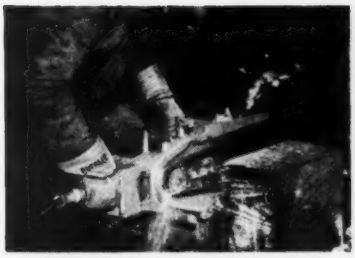


HIGH CYCLE GRINDERS

HIGH CYCLE WRENCHES



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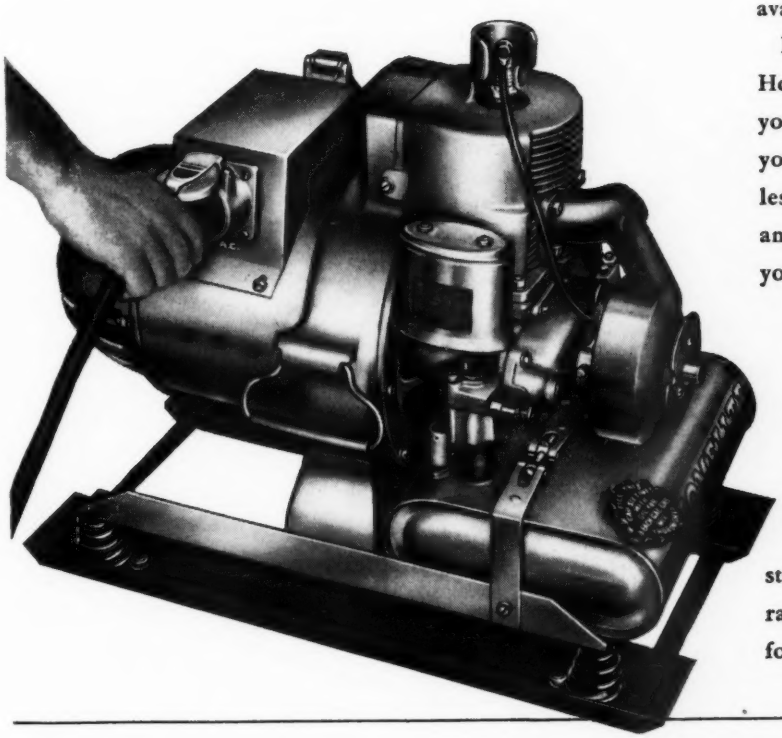

It's the fastest way to do it. In fact, if there's no commercial power supply available it's the only way to do it.

Plug into a light weight carryable Homelite Dual Purpose Generator and you'll get the power you need to run your faster operating, more efficient and less troublesome high cycle tools. Yes, and plug into this same generator and you'll also get the power you need for floodlighting or operating standard universal tools.

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SPEEDS UP TO 1800 R.P.M. FOR PUMPING CLEAN LIQUIDS

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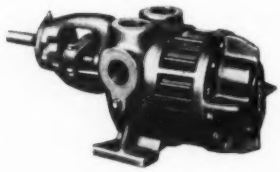
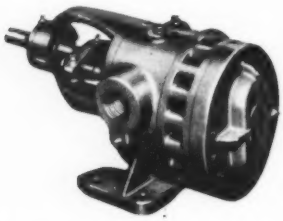
Four-port design offers 8 optional piping arrangements. Equal size helical gears run in axial hydraulic balance. Standard or bronze fitted; packed box or mechanical seal. Up to 300 P.S.I.—1 to 300 G.P.M. for clean liquids.





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Widely used for hydraulic mechanisms and other applications where high pressures are required. Spur gears provide high volumetric efficiency. Packed box or mechanical seal. Pressures to 1000 P.S.I. — 5 to 75 G.P.M. sizes.

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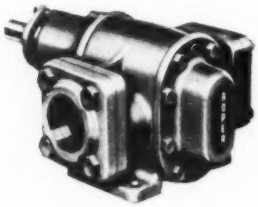
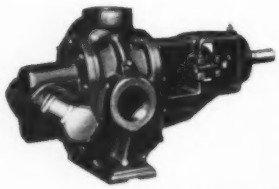
For hydraulic service, fuel transfer or fuel supply. Features helical gears and exclusive Venturi suction and discharge principle in 10 through 50 G.P.M. sizes. Packed box or mechanical seal. 150 P.S.I. — 3/4 to 50 G.P.M.





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For general purpose work handling thin or thick liquids with suction lift up to 15 feet. Standard or bronze fitted; with or without built-in relief valve. Pressures to 60 P.S.I. — 40 to 300 G.P.M.

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Association News (Cont'd)

in the Tehachapi mountains in California following the earthquake last July. The other picture, entitled "Snow on the Run," showed the severe snow conditions encountered by this road in the Sierra mountains, and depicted the equipment and methods used by the Southern Pacific to keep trains running. The showing of the films was preceded by preliminary remarks by Carl Olsen, passenger traffic manager of the SP.

Metropolitan Maintenance of Way Club

J. W. Wiggins, engineer maintenance of way of the Maine Central, was the speaker at a dinner meeting of the club which was held at the Hotel Shelburne, New York, on October 30, with 100 members and guests in attendance. In his talk, "Railroading in Maine," Mr. Wiggins discussed maintenance of way work and programs as practiced on the Maine Central and in connection therewith spoke of the rsources of Maine, the sources of revenue to the railroad, and the problems which they have, particularly with severe winter conditions.

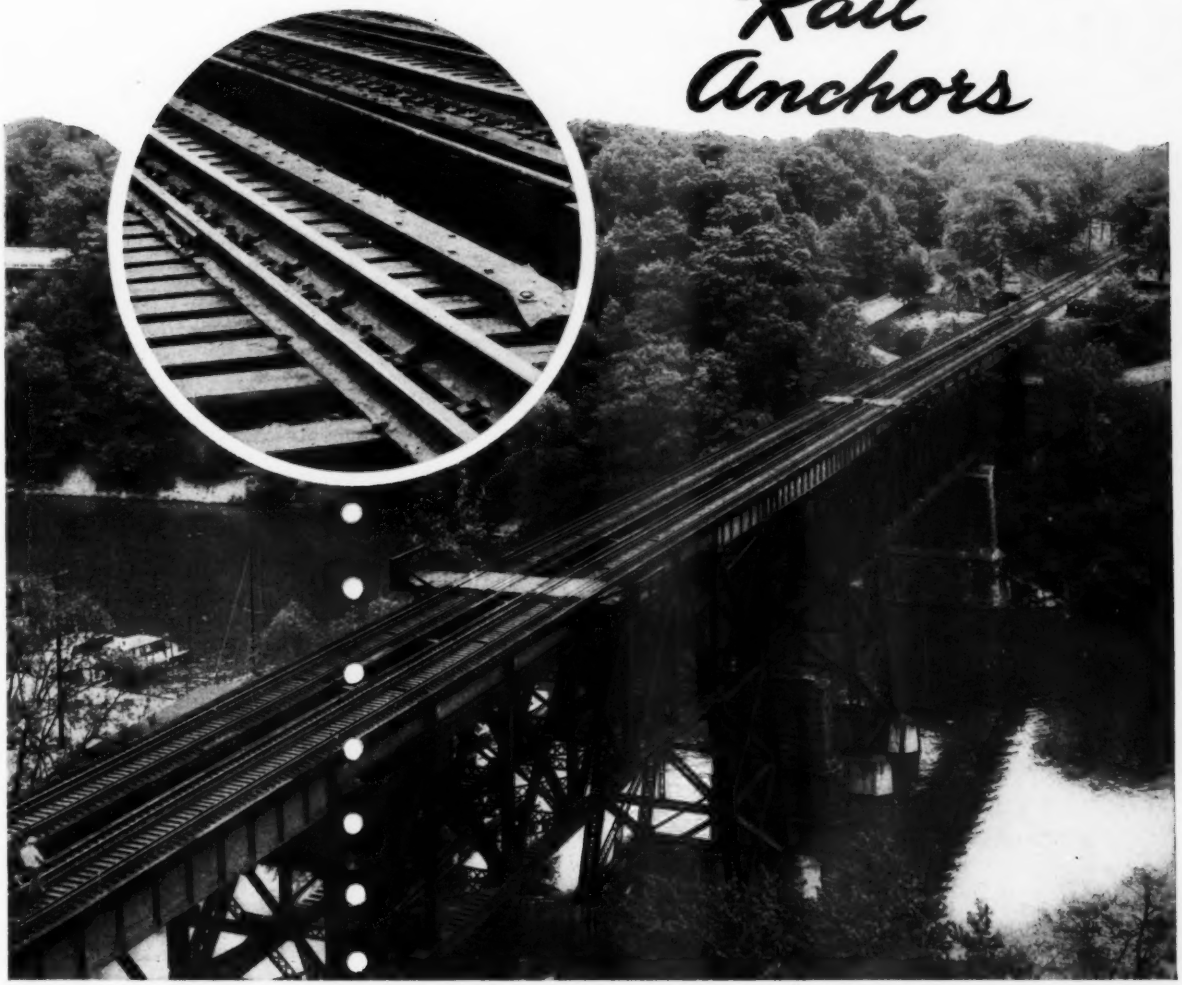
A luncheon meeting of the club will be held at the Hotel Shelburne on December 11, the program for which had not been completed at the time this issue went to press.

Maintenance of Way Club Organized at St. Louis

A club composed of railway engineering and maintenance personnel and representatives of supply companies serving this field has been organized at St. Louis and held its first meeting at the De Soto hotel in that city on October 27. A. B. Chaney, assistant chief engineer system-maintenance, Missouri Pacific, acted as temporary chairman. The objectives of the new club, which has been named the Mississippi Valley Maintenance of Way Club, are to "meet and discuss questions pertaining to the design, construction and maintenance of the fixed properties of the railroads."

(*Continued on page* 1216)

COMPRESSION *Rail Anchors*



For Butt-Welded Rail

The economy of continuous pressure-welded rail through bridges, tunnels, station platforms and in main line track has been convincingly demonstrated time and again. Above is shown a bridge installation of butt-welded rail on a large mid-western road. On this and many similar installations *two-way holding* is assured with Compression Rail Anchors.

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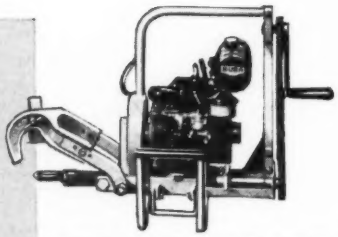
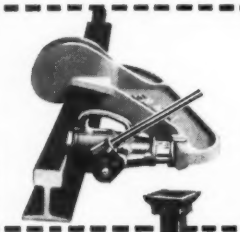
TRACK MAINTENANCE TOOLS

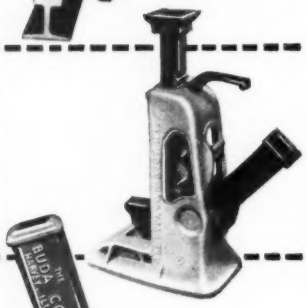
TRACK DRILLS
Light weight, heavy duty Buda Power Track Drills are designed for fast, safe one-man operation. Track gangs like them because they're easier to carry, operate and maintain. Powered by a long-life, easy starting 1½ H.P. gasoline engine.



RAIL BENDERS
One man easily bends 152 lb. rail, cold—easily, accurately with a Buda Model 130 Jack Type Rail Bender. Simple construction—fool proof operation means no maintenance. Ram scale assures exact duplication of bends. Supplied with 25 or 35 ton special journal jacks.

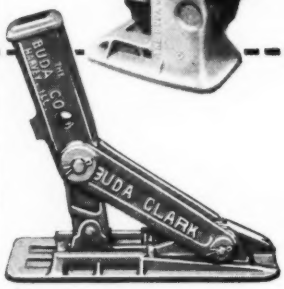


TRACK JACKS
Buda Jacks provide safe, positive operation at any angle, have interchangeable parts and are heavy duty built. 6 Models—capacity to 15 tons. All jacks have the fast-trip feature that permits fast load drops when required.

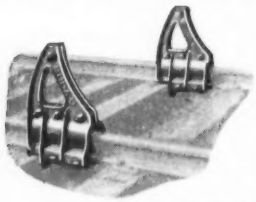


TRACK LINERS
Three men with Buda Track Liners align more rail than eleven men with lining bars. Liners don't raise track . . . no digging required . . . Liner's don't obstruct track.

Write for illustrated Bulletins on Buda Track Maintenance Tools today.



BUDA Car Stops and Bumping Posts



Car Stops can be installed in a few minutes. Heavy duty, built for years of service. Buda Bumping Posts are designed to absorb severe blows without damage to lading or cars. Installed by 2 men in less than 1 hour.

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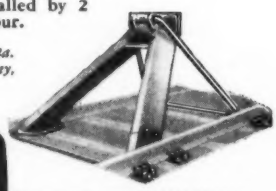

BR-10 **BUDA**

Association News (Cont'd)

The purpose of the first meeting, which was attended by 213 persons, was to adopt a constitution and to elect officers. The officers elected are as follows: President, V. C. Hanna, chief engineer, Terminal Railroad Association of St. Louis; first vice-president, Mr. Chaney; second vice-president, F. R. Micheal, engineer of track, Wabash; secretary-treasurer, P. E. Odom, chief clerk to vice-president in charge of operations, St. Louis-San Francisco. Directors elected to serve for one year are: R. W. Schmidt, chief engineer, Manufacturers Railway Company; E. L. Anderson, chief engineer, St. Louis-San Francisco; and W. J. Nuebling, chief engineer, Alton & Southern. Directors elected to serve for two years are: K. H. Hanger, chief engineer, Missouri-Kansas-Texas; J. C. Bousfield, chief engineer, Wabash; and J. C. Boston, principal assistant engineer, Missouri Pacific.

It is contemplated that the club will hold monthly dinner meetings during the fall, winter and spring seasons, at which

Meetings and Conventions

American Railway Bridge and Building Association—Annual meeting, September 15-17, 1953, Conrad Hilton (Stevens) Hotel, Chicago. Elise LaChance, Secretary, 431 S. Dearborn street, Chicago 5.

American Railway Engineering Association—Annual Meeting, March 17-19, 1953, Chicago. Neal D. Howard, Secretary, 59 E. Van Buren street, Chicago 5.

American Wood-Preservers' Association—Annual meeting, April 28, 1953, Cleveland Hotel, Cleveland, Ohio. W. A. Penrose, Secretary-treasurer, 839 Seventeenth street, N. W., Washington 6, D. C.

Bridge and Building Supply Association—L. R. Gurley, Secretary, 201 North Wells street, Chicago 6.

Maintenance of Way Club of Chicago—Next meeting December 15. E. C. Patterson, Secretary-treasurer, Room 1512, 400 W. Madison street, Chicago 6.

Metropolitan Maintenance of Way Club—Secretary, 30 Church street, New York.

Mississippi Valley Maintenance of Way Club—P. E. Odom, Secretary-Treasurer, Room 1008, Frisco Building, 906 Olive Street, St. Louis 1, Mo.

National Railway Appliances Association—J. B. Templeton, Secretary, 1020 So. Central avenue, Chicago 44; Lewis Thomas, Assistant Secretary, 59 East Van Buren street, Chicago 5.

Railway Tie Association—Roy M. Edmonds, Secretary-treasurer, 1221 Locust Street, St. Louis 3, Mo.

Roadmasters' and Maintenance of Way Association of America—Annual meeting, September 15-17, 1953, Conrad Hilton (Stevens) Hotel, Chicago. Elise LaChance, Secretary, 431 S. Dearborn street, Chicago 5.

Track Supply Association—Lewis Thomas, Secretary, 59 E. Van Buren street, Chicago 5.

problems of mutual interest to the members will be considered. More than 380 persons have already joined the new organization.

The first regular meeting of the new Club was held on December 8, also at the De Soto hotel, St. Louis. The speaker was George M. O'Rourke, assistant engineer maintenance of way, Illinois Central, who gave an illustrated lecture based on his observations of railroads in Germany during a trip taken several years ago.

Railway Tie Association

The association held its thirty-fourth annual convention at the Jung hotel, New Orleans, La., on October 22-24. Attendance at the meeting totaled 510 members and guests, including 131 railroad men. This was the largest attendance in the history of the association. The meeting was directed by the president of the association, W. J. Chambliss, Jr., vice-president, Bond Brothers, Louisville, Ky., assisted by Harry Dunstan, vice-president, Southern Wood Preserving Company, Atlanta, Ga., and first vice-president of the association.

During the three-day program of addresses and reports, the problems of the producers of ties received primary emphasis although much information of direct interest to railway men was presented. Among the features in the latter category were two addresses on "What's the Outlook for '53?" This question was answered from the standpoint of the railroads by J. H. Aydelott, vice-president, Operations and Maintenance department, Association of American Railroads, and from the standpoint of the tie producers by D. B. Frampton, president, D. B. Frampton & Co. Other features of direct interest to railroad men were addresses by T. A. Blair, chief engineer system, Atchison, Topeka & Santa Fe, on "Two Years Experience on the Santa Fe in Using Tie Inspectors to Determine the Cause of Failure of Ties at the Time They are Removed" (see feature section this issue); by C. B. Harveson, chief engineer maintenance, Baltimore & Ohio, on "History of Crossties on the B&O"; by Merwin H. Dick, editor, *Railway Engineering and Maintenance*, on "Class I Tie Requirements in '53"; by A. L. Kuehn, president, American Creosoting Company, on "What Is the Most Economic Length of Life for Crossties?"; and by J. M. Hood, president, American Short Line Railroad Association, on "Short Lines Also Use Ties."

Committee reports of particular interest to users of ties were those of the Committee for the Better Understanding of Problems Between Tie Producers and Users, of which Paul D. Brentlinger, forester, Pennsylvania, was chairman; on Timber Conservation, of which D. B. Mabry of the T. J. Moss Tie Company was chairman; and on Checking and Splitting of Crossties, of which J. A. Vaughn of the Southern Wood Preserving Company was chairman.

In the election of officers Mr. Dunstan was advanced to president; J. E. Peterson, vice-president, Gross & Janes Co., St. Louis, Mo., was advanced from second

(*Continued on page* 1218)

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A MAN, A PAIL AND THRIFTY BORASCU

BORASCU® ...the modern way to rid fire-hazardous weeds and grasses from timber trestles, buildings and tie storage areas. Sections hands apply BORASCU easily without tieing up tracks and equipment; applying it dry from convenient, easily disposable 100-lb. multi-wall paper bags, by hand-broadcasting from pails or using mechanical spreaders. The savings add up fast...some roads have determined they save as much as $1.66 per lineal foot of trestle per year by using BORASCU! It's real economy to prescribe BORASCU—a weed killer destructive to *all* types of vegetation; nontoxic, nonfire-hazardous, and noncorrosive to ferrous metals and copper...try it!

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vice-president to first vice-president; and J. H. Tabb, J. H. Tabb & Co., Houston, Miss., was elected second vice-president. Elected to the Executive committee were Edward F. Schlafly, Potosi Tie & Lumber Co., St. Louis; Meyer Levy, T. J. Moss Tie Company, St. Louis; Frank W. Campbell, Jr., W. B. Crane Company, Chicago; and Douglas Grymes, Jr., Koppers Company, Inc., Pittsburgh, Pa. In addition, Mr. Chambliss, as retiring president, automatically becomes a member of the Executive Committee. Roy M. Edmonds was re-elected secretary-treasurer by the Executive committee.

Supply Trade News

General

The **Portland Cement Association** has opened its 27th district office, this one in Helena, Mont. **Jack Y. Barnes,** field engineer with the association's Des Moines (Iowa) office, has been named district engineer in charge of Helena.

The **International Harvester Company** has announced that it has acquired the stock of the **Frank G. Hough Company,** Libertyville, Ill. The Hough Company will be operated as a wholly owned subsidiary with no immediate change in its organization.

Personal

The Kershaw Manufacturing Co., Inc., Montgomery, Ala., has appointed **Eugene F. Turner** as direct sales-service representative for the mid-central United States, with headquarters at Chicago. Mr. Turner has been associated with the railroads and maintenance of way field since 1927.

Charles Rager, district manager for **Fairmont Railway Motors, Inc.,** Fairmont, Minn., with headquarters at St. Louis, Mo., has been appointed district manager at Chicago. **George Adams,** sales representative in the firm's Chicago district, has been promoted to district manager at St. Louis, succeeding Mr. Rager.

Mr. Rager became associated with Fairmont in 1939 and served as a sales representative in the Chicago district

Charles Rager

prior to his appointment as district manager at St. Louis in 1946.

Mr. Adams joined Fairmont in 1935, and for two years was located at the

George Adams

firm's home office at Fairmont. Prior to moving to the Chicago district, he worked in the Washington, D. C. district.

• The Atchison, Topeka and Santa Fe knew that they had a bad termite and rot problem in many installations in Southern California. They decided to rely on "Wolmanized"* lumber in this badly infested termite area. After 12 years of service, results have borne out their confidence in "Wolmanized" lumber for stations like the one above in Pomona, California.

Many railroad and dock installations call for the strength, resilience and insulating qualities of wood. Wolman preservative salts will protect that wood from rot, decay or insect attack . . . yet leaves it odorless, paintable and harmless to lading. For further information, write:

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General Offices: 1601 McCormick Bldg. • Chicago 4, Illinois

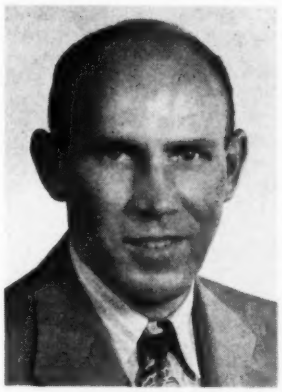
Offices: Little Rock, Ark. • Portland, Ore. • Boston • Los Angeles San Francisco • Baltimore • New York • Jacksonville, Fla.

R. D. Hill has been elected executive vice-president and treasurer of the **Taylor-Wharton Iron & Steel Company.** Formerly located at the company's offices in

R. D. Hill

Cincinnati, Ohio, Mr. Hill will now be located at High Bridge, N. J., where he will be responsible for the coordination

(*Continued on page* 1220)



Dr. Leland Butler

Herman Steudel

The *Reade Manufacturing Company* has announced the completion of its new agronomy research laboratory in Jersey City, N. J. This laboratory will be under the direct supervision of *Dr. Leland Butler* with *Herman Steudel* as assistant. The new laboratory will be used for plant control study.

100% Self Contained

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GASOLINE HAMMERS

New PB-51 PAVING BREAKER

New RD-51 ROCK DRILL

New SPIKE SD-51 DRIVER

Low Initial Cost—100% Self Contained, Syntron Gasoline Hammers do not require expensive auxiliary power equipment such as air compressor, hose and accessories.

Low Operating Cost—One man operation—no crew necessary—consumes about 2 qts. low test fuel per hour under continuous running.

Low Maintenance Cost—No batteries to run down; no springs to fatigue and break—the striking piston is a free piston actuated by the explosive energy of gasoline.

Greater Breaking Power

The fast, efficient, low cost operation of a Syntron Paving Breaker will save you money on job after job. Its powerful 2000 sharp blows per minute with the new heavy piston that adds 50% more power to each blow do a better job and reduce job-time and job-fatigue. It's versatile—general contractors, public utilities, cemeteries, prospectors, etc., use them to bust concrete, cut asphalt, dig clay and shale and tamp backfill.

Faster Drilling Speed

The Syntron Rock Drill's high-torque rotation of the drill bit plus continuous exhaust gas pressure cleaning of the hole provides for easy, fast drilling of up to 2½" diameter holes. Extremely portable—compact in size—ruggedly constructed to stand rough, severe service, the Syntron Rock Drill is a "natural" for fast, economical drilling in all kinds of rock.

Higher Driving Efficiency

The Syntron Spike Driver is easily handled by any one workman—no crew or auxiliary equipment is necessary. It is equipped with a special nose piece and spike centering tool for driving cut spikes into treated railroad ties, road form pins and spikes in bridge and deck work. The Syntron Spike Driver will do a faster, better job than slow laborious hand methods and at the same time cut labor costs and reduce fatigue.

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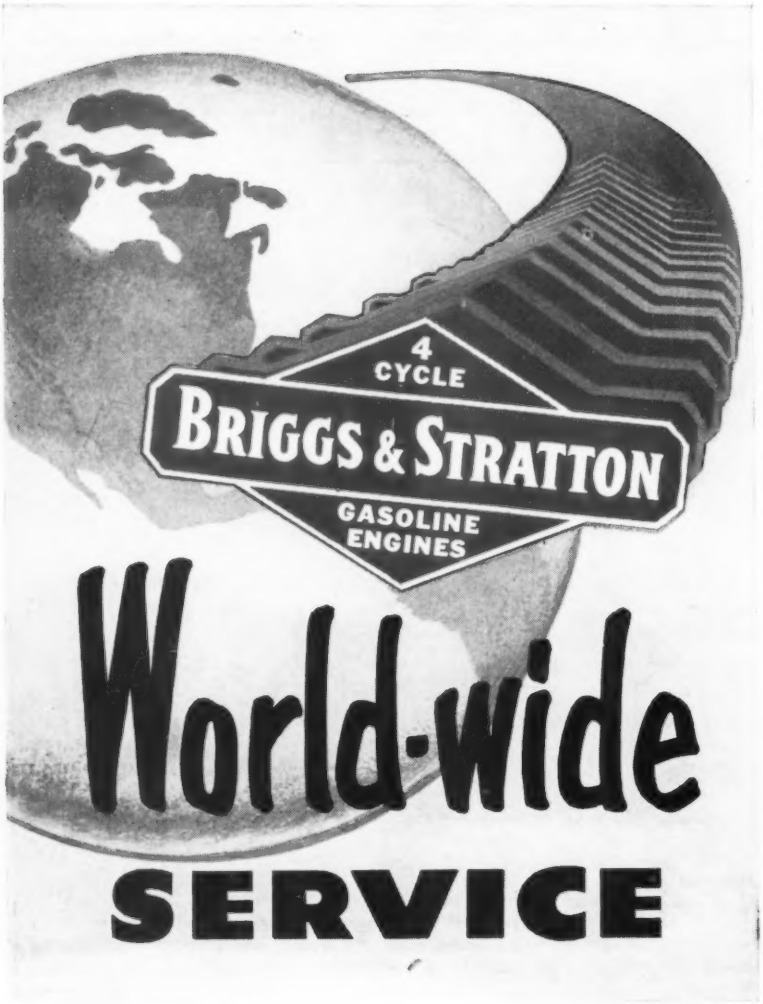

THE GREATEST SERVICE ORGANIZATION OF ITS KIND IN THE WORLD . . .

Near you there is a Briggs & Stratton service organization — factory trained and supervised — ready to tune up, repair, or even rebuild your Briggs & Stratton engines with *original* Briggs & Stratton parts.

If your Briggs & Stratton engines are not busy during these winter months, now is the ideal time to have them serviced — to insure continued peak performance for busy periods ahead.

Only Briggs & Stratton maintains such complete world-wide authorized service facilities — a big "plus" that you get only when you specify Briggs & Stratton engines on the gasoline powered equipment you buy.

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In the automotive field Briggs & Stratton is the recognized leader and world's largest producer of locks, keys and related equipment.

Supply Trade News (Cont'd)

of all activities and operations of the company's manganese steel foundry in High Bridge, and the forged steel cylinder and railroad trackwork plant in Easton, Pa. He will also continue his former responsibilities as chief financial officer of Taylor-Wharton.

A. V. Higgins has been appointed manager of the Western transportation zone of the **Sherwin-Williams Company**, Cleveland, Ohio. Mr. Higgins, who for the past several years has headed national account sales in the firm's Western region, will continue to make his headquarters in Chicago.

John S. Conway, general sales manager for the **Koehring Company**, Milwaukee, Wis., has been promoted to vice-president in charge of sales, and **John E. Chadwick**, Western sales manager of the Kwik-Mix Company, a Koehring subsidiary, located at Port Washington, Wis., has been named sales manager.

Mr. Conway joined the Koehring Company's production department in 1941

John S. Conway

after having been engaged in engineering and sales work for the French Battery Company and the Chevrolet Motor Com-

***W. L. Voegeli* has been named to fill the newly created position of assistant director of engineering, Tractor division, *Allis-Chalmers Manufacturing Company*, Milwaukee, Wis.**

pany. He also served Koehring in the parts and repair department and worked as credit manager prior to his appointment as export manager in 1945. Mr. Conway was named general sales manager in 1948.

Mr. Chadwick became associated with the Koehring Company in 1945 after having served for 16 years as assistant to the state maintenance engineer of the Missouri Highway Department. Upon joining Koehring, he directed the organi-

John E. Chadwick

zation of the company's sales school education program in Milwaukee and in the field. Prior to his appointment as Western sales manager of Kwik-Mix, Mr. Chadwick served Koehring as assistant sales manager.

Trade Publications

To obtain copies of any of the publications mentioned in these columns, use postcards, page 1166.

Homelite—The Homelite Corporation has issued a 24-page, 2-color booklet describing the company, its products and the people who comprise it. Photographs present both interior and exterior views of company buildings and Homelite products in actual use. A brief historical review and financial study of the organization is also presented.

Creosote—A new, 3-color, 12-page booklet has recently been published by the Tar Products division of the Koppers Company, Inc., which explains the chemical properties of creosote that give it a preserving action in wood. Life expectancies of various types of woods treated with creosote are presented, as are photographs showing several typical installations of Creosote-treated wood.

Locomotive Cranes—The Orton Crane & Shovel Company has recently issued its Catalog No. 48 describing Orton torque-control locomotive cranes. The 16-page, 2-color booklet describes the construction features of the cranes and presents complete specifications, capacities, etc. The last two pages of the booklet are devoted to the presentation of a listing of firms which own and operate two or more Orton cranes.

Shovels—Cranes—A new four-color catalog describing the Model 75A and 75B shovels and the 75BT truck crane has been announced by Gar Wood Industries, Inc., Findlay division. The new catalog describes in detail construction and operational features of the devices, including fluid coupling. Brief specifications of the equipment are also presented along with photographs which show the units in operation on various types of jobs.

Motor Cars and Work Equipment—Bulletin 660, a catalog of the entire Fairmont line of engines, motor cars, car accessories, trailers, push cars, ballast maintenance cars, tool cars, ballast discers, weed burners, weed mowers, weed sprayers, oil sprayers, grouting outfits, derrick cars, and numerous rail-laying and tie-renewal equipment, has recently been issued by Fairmont Railway Motors, Inc. The 52-page, 2-color presentation also includes complete specifications and available attachments for each piece of equipment listed.

Installing Insulation—Information on cost-reducing methods of installing all types of insulation material is combined with general information on the Nelweld method and equipment in a 35-page booklet recently compiled by Nelson Stud Welding, division of Gregory Industries, Inc. A contractor's tip sheet lists factors

(*Continued on page* 1222)

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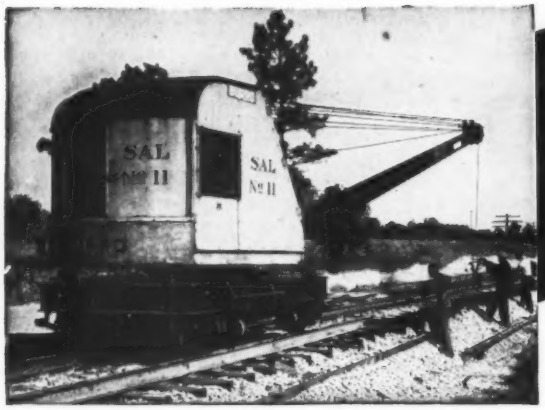

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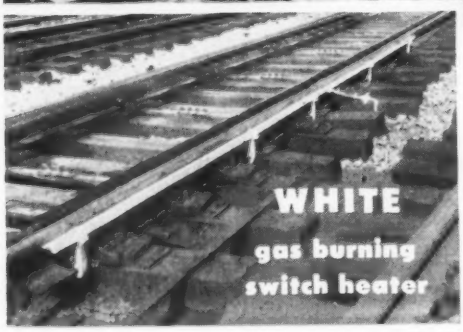

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Trade Publications (Cont'd)

which should be given consideration when figuring installation jobs. Detailed information, complete with pictures and diagrams, is included on the various types of end-welded studs for use with various types of insulation. Stud fasteners and insulation are classified by types and uses to aid in the selection of materials and fasteners to obtain any desired results.

Caterpillar History—A booklet ntitled, "Producers of Wealth," published by the Caterpillar Tractor Company, dealing with the company's growth during the period from 1930 to 1950, has recently been made available and has been distributed to the company's customers and dealers. The 14-page booklet, illustrated with photographs and graphic presentations of statistics, covers all phases of the company's operation during the past two decades. Sections are devoted to Caterpillar's growth in sales and net assets; its management, its financial position and its outlook for continued extension of sales and production facilities.

Spreaders, Ditchers and Snowplows—The O. F. Jordan Company has recently issued a set of three bulletins describing the three types of Jordan spreader-ditcher-snowplows for heavy construction, roadbed maintenance and snow fighting jobs. The "Standard Type" bulletin features spreaders, spreader-ditchers and spreader-ditcher-snowplows for all normal construction, roadbed maintenance and snow fighting work. The "Road-Master" bulletin features equipment designed to accomplish work of a somewhat heavier nature, while the third "Type A" bulletin describes equipment designed for the heaviest jobs. All bulletins are illustrated with action photographs. A separate leaflet, containing design and construction details of all Jordan equipment, is also available.

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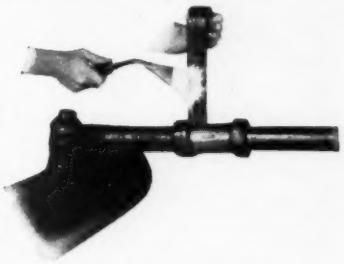

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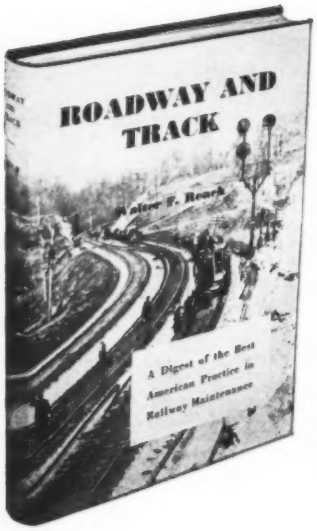

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But the Gradall's unique arm-action handled the job swiftly and with greater precision than the hand labor and machines it replaced. Working from the top of the bank, often around posts and other obstacles, it first trimmed the top part of the slope. Then, backed into the narrow passageway, its hydraulic-telescoping boom "reached out" to finish the slope's lower portion, as well as digging a drainage ditch and cleaning the roadbed right up to the ties—all from this cramped position—with no interruption in traffic.

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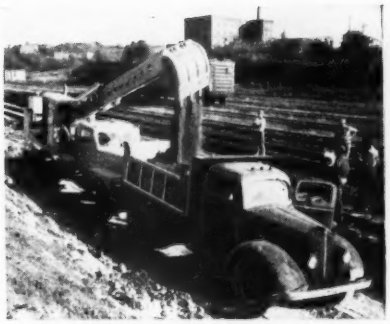

Gradall's 360° mount and telescoping boom permitted loading spoil over cab into waiting truck, necessitated here by one-way approach to work area.

Hydraulic arm-action boom tilts bucket to work at any angle.

Note clean precision of finished slope and close work around ties with no hand labor.

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